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APRIL, 1951

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Editor

JOHN W. CAMPBELL, JR.

Assistant Editor

KAY TARRANT

Adv. Mgr.

WALTER J. MC BRIDE

Illustrations by Cartier, Orban, Rogers and Ward

COVER BY ROGERS

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CAUSUS BELLI

From the earliest recorded history to the present year 1951, the dominating note has been conflict, war, and rioting. Man's proud history resembles, to a rather alarming degree, an experimental psychologist's notes on what happens when a dozen particularly maladjusted, brattish six-year-olds are put in the same room with fifteen different kinds of toys. Brief periods of peace and quiet interlarder thinly between layers of squalling quarrels.

The causes of war, some say, are purely economic. It's a struggle for land, a struggle for the natural resources of the world. It's been called "a place in the sun," and it's been called "lebensraum." The paranoid nation fights because every other nation is against it. There have been wars in defense of trade routes, and wars to maintain markets in this, that, or the other area.

And all these excuses for war are smoke screens erected to conceal the one, single, fundamental cause of war

—a difference of ideas, held stubbornly, unreasonably, and bloodily. There never was a war for any other cause whatsoever. There never was a war held to achieve access to a needed natural resource, a needed trade route, or for living space.

The United States is a great industrial nation, its economy based on iron and iron alloys. For peacetime mechanisms, for armor plate in war, nickel is an absolutely essential material. Yet the United States has no nickel mines. Canada, militarily far weaker than the United States, has the world's greatest nickel mines. Now if wars are launched because of the economic necessity of obtaining access to needed mineral resources—obviously, there can be only one conclusion.

Obviously, wars aren't launched for any such reason. The United States and Canada have highly congenial ideas, and systems of thought and evaluation. We work together fine, a completely harmonious mu-

tual respect. We've saved a good many billions of dollars by not fortifying that long frontier—and we have free access to the minerals of Canada, as Canada has had free access to the oil wealth of the United States. Because the ideas and thought patterns of the two peoples of the northern North American continent don't get into conflict.

In most suburban neighborhoods, someone owns a post-hole digger, and someone else owns a lawn roller, and someone else may own a power lawn mower. Joe buys his kids a slide to play on, and Bill erects a big, husky swing, and Bob installs a wading pool, with a sandbox nearby for his. And all the kids drift from one back yard to another freely, enjoying, between them, equipment that no one family could afford for any of them. The resources of the community are privately owned, but mutually shared for mutual benefit.

There's no need for physical possession and legal ownership to achieve access to anything. Access is determined solely on a mental—an ideational—level.

The business of need for "lebensraum" of course, is somewhat different. It's based, fundamentally, on the proposition "I and my people are better than you and your people, and therefore we must breed like rabbits so there will be more of us. And because we overrun our land, with our breeding without end, we must take yours away."

This, it might be pointed out, is not exactly a sane philosophy. There

are a number of sane approaches to such a problem. The most evident is to institute a birth control program. Emigration is another perfectly sane approach. England has, for many years, operated on a basis that actually amounts to extreme overpopulation; there are more English people than the British Isles can feed. Some emigrated. But their main solution to the problem is an excellent one; they worked out the answer. They buy their food from others, in exchange for services—shipping, tourist trade, banking and insurance—and processing of raw materials into finished goods.

In a community, a man and wife have every sane right to as many children as they can support adequately and soundly. They have no right to burden their charitable neighbors by unrestricted breeding of children they cannot feed.

There is no war, and has been no war, that was not rooted in someone's insane ideas—and generally, you can tell which party is most guilty by inspecting the opposing systems of ideas, and seeing which is inherently most flexible, most open to variations and differences. Only glass-brittle structures of ideas are endangered to the point of producing national insanity by the need to yield and bend a bit to another system of ideas. And if a pattern of ideas is too rigid to bend, inevitably, sooner or later, it must be broken.

Mankind is not rigid; men cannot be kept in rigid prisons.

THE EDITOR.



TEMPLE TROUBLE

BY H. BEAM PIPER

Miracles to order was a fine way for the paratimers to get mining concessions—but Nature can sometimes pull counter-miracles. And so can men, for that matter . . .

Illustrated by Rogers

Through a haze of incense and altar smoke, Yat-Zar looked down from his golden throne at the end of the dusky, many-pillared temple. Yat-Zar was an idol, of gigantic size and extraordinarily good workmanship; he had three eyes, made of turquoises as big as doorknobs, and six arms. In his three right hands, from top to bottom, he held a sword with a flame-shaped blade, a jeweled

object of vaguely phallic appearance, and, by the ears, a rabbit. In his left hands were a bronze torch with burnished copper flames, a big goblet, and a pair of scales with an egg in one pan balanced against a skull in the other. He had a long bifurcate beard made of gold wire, feet like a bird's, and other rather startling anatomical features. His throne was set upon a stone plinth about twenty

feet high, into the front of which a doorway opened; behind him was a wooden screen, elaborately gilded and painted.

Directly in front of the idol, Ghullam the high priest knelt on a big blue and gold cushion. He wore a gold-fringed robe of dark blue, and a tall conical gold miter, and a bright blue false beard, forked like the idol's golden one; he was intoning a prayer, and holding up, in both hands, for divine inspection and approval, a long curved knife. Behind him, about thirty feet away, stood a square stone altar, around which four of the lesser priests, in light blue robes with less gold fringe and dark-blue false beards, were busy with the preliminaries to the sacrifice. At considerable distance, about halfway down the length of the temple, some two hundred worshipers—a few substantial citizens in gold-fringed tunics, artisans in tunics without gold fringe, soldiers in mail hauberks and plain steel caps, one officer in ornately gilded armor, a number of peasants in nondescript smocks, and women of all classes—were beginning to prostrate themselves on the stone floor.

Ghullam rose to his feet, bowing deeply to Yat-Zar and holding the knife extended in front of him, and backed away toward the altar. As he did, one of the lesser priests reached into a fringed and embroidered sack and pulled out a live rabbit, a big one, obviously of domestic breed, holding it by the ears while one of his fellows took it by the hind legs.

A third priest caught up a silver pitcher, while the fourth fanned the altar fire with a sheet-silver fan. As they began chanting antiphonally, Ghullam turned and quickly whipped the edge of his knife across the rabbit's throat. The priest with the pitcher stepped in to catch the blood, and when the rabbit was bled, it was laid on the fire. Ghullam and his four assistants all shouted together, and the congregation shouted in response.

The high priest waited as long as was decently necessary and then, holding the knife in front of him, stepped around the prayer-cushion and went through the door under the idol, into the Holy of Holies. A boy in novice's white robes met him and took the knife, carrying it reverently to a fountain for washing. Eight or ten under-priests, sitting at a long table, rose and bowed, then sat down again and resumed their eating and drinking. At another table, a half-dozen upper priests nodded to him in casual greeting.

Crossing the room, Ghullam went to the Triple Veil in front of the House of Yat-Zar, where only the highest of the priesthood might go, and parted the curtains, passing through, until he came to the great gilded door. Here he fumbled under his robe and produced a small object like a mechanical pencil, inserting the pointed end in a tiny hole in the door and pressing on the other end. The door opened, then swung shut behind him, and as it locked itself, the lights came on within. Ghullam removed his miter and

his false beard, tossing them aside on a table, then undid his sash and peeled out of his robe. His regalia discarded, he stood for a moment in loose trousers and a soft white shirt, with a pistollike weapon in a shoulder holster under his left arm—no longer Ghullman the high priest of Yat-Zar, but now Stranor Sleth, resident agent on this time-line of the Fourth Level Proto-Aryan Sector for the Transtemporal Mining Corporation. Then he opened a door at the other side of the anteroom and went to the antigrav shaft, stepping over the edge and floating downward.

There were temples of Yat-Zar on every time-line of the Proto-Aryan Sector, for the worship of Yat-Zar was ancient among the Hulgum people of that area of paratime, but there were only a few which had such installations as this, and all of them were owned and operated by Transtemporal Mining, which had the fissionable ores franchise for this sector. During the ten elapsed centuries since Transtemporal had begun operations on this sector, the process had become standardized. A few First Level paratimers would transpose to a selected time-line and abduct an upper-priest of Yat-Zar, preferably the high priest of the temple at Yolday or Zurb. He would be drugged and transposed to the First Level, where he would receive hypnotic indoctrination and, while unconscious, have an operation performed on his ears which would en-

able him to hear sounds well above the normal audible range. He would be able to hear the shrill sonar-cries of bats, for instance, and, more important, he would be able to hear voices when the speaker used a First Level audio-frequency step-up phone. He would also receive a memory-obliteration from the moment of his abduction, and a set of pseudo-memories of a visit to the Heaven of Yat-Zar, on the other side of the sky. Then he would be returned to his own time-line and left on a mountain top far from his temple, where an unknown peasant, leading a donkey, would always find him, return him to the temple, and then vanish inexplicably.

Then the priest would begin hearing voices, usually while serving at the altar. They would warn of future events, which would always come to pass exactly as foretold. Or they might bring tidings of things happening at a distance, the news of which would not arrive by normal means for days or even weeks. Before long, the holy man who had been carried alive to the Heaven of Yat-Zar would acquire a most awesome reputation as a prophet, and would speedily rise to the very top of the priestly hierarchy.

Then he would receive two commandments from Yat-Zar. The first would ordain that all lower priests must travel about from temple to temple, never staying longer than a year at any one place. This would insure a steady influx of newcomers personally unknown to the local

upper-priests, and many of them would be First Level paratimers. Then, there would be a second commandment: A house must be built for Yat-Zar, against the rear wall of each temple. Its dimensions were minutely stipulated; its walls were to be of stone, without windows, and there was to be a single door, opening into the Holy of Holies, and before the walls were finished, the door was to be barred from within. A triple veil of brocaded fabric was to be hung in front of this door. Sometimes such innovations met with opposition from the more conservative members of the hierarchy; when they did, the principal objector would be seized with a sudden and violent illness; he would recover if and when he withdrew his objections.

Very shortly after the House of Yat-Zar would be completed, strange noises would be heard from behind the thick walls. Then, after a while, one of the younger priests would announce that he had been commanded in a vision to go behind the veil and knock upon the door. Going behind the curtains, he would use his door-activator to let himself in, and return by paratime-conveyer to the First Level to enjoy a well-earned vacation. When the high priest would follow him behind the veil, after a few hours, and find that he had vanished, it would be announced as a miracle. A week later, an even greater miracle would be announced. The young priest would return from behind the Triple Veil, clad in such

raiment as no man had ever seen, and bearing in his hands a strange box. He would announce that Yat-Zar had commanded him to build a new temple in the mountains, at a place to be made known by the voice of the god speaking out of the box.

This time, there would be no doubts and no objections. A procession would set out, headed by the new revelator bearing the box, and when the clicking voice of the god spoke rapidly out of it, the site would be marked and work would begin. No local labor would ever be employed on such temples; the masons and woodworkers would be strangers, come from afar and speaking a strange tongue, and when the temple was completed, they would never be seen to leave it. Men would say that they had been put to death by the priests and buried under the altar to preserve the secrets of the god. And there would always be an idol to preserve the secrets of the god. And there would always be an idol of Yat-Zar, obviously of heavenly origin, since its workmanship was beyond the powers of any local craftsman. The priests of such a temple would be exempt, by divine decree, from the rule of yearly travel.

Nobody, of course, would have the least idea that there was a uranium mine in operation under it, shipping ore to another time-line. The Hulgum people knew nothing about uranium, and neither did they as much as dream that there were other time-lines. The secret of paratime transposition belonged exclusively to the

First Level civilization which had discovered it, and it was a secret that was guarded well.

Stranor Sleth, dropping to the bottom of the antigrav shaft, cast a hasty and instinctive glance to the right, where the freight conveyers were. One was gone, taking its cargo over hundreds of thousands of parayears to the First Level. Another had just returned, empty, and a third was receiving its cargo from the robot mining machines far back under the mountain. Two young men and a girl, in First Level costumes, sat at a bank of instruments and visor-screens, handling the whole operation, and six or seven armed guards, having inspected the newly-arrived conveyer and finding that it had picked up nothing inimical en route, were relaxing and lighting cigarettes. Three of them, Stranor Sleth noticed, wore the green uniforms of the Paratime Police.

"When did those fellows get in?" he asked the people at the control desk, nodding toward the green-clad newcomers.

"About ten minutes ago, on the passenger conveyer," the girl told him. "The Big Boy's here. Brannad Klav. And a Paratime Police officer. They're in your office."

"Uh huh; I was expecting that," Stranor Sleth nodded. Then he turned down the corridor to the left.

Two men were waiting for him, in his office. One was short and stocky, with an angry, impatient face—Brannad Klav, Transtemporal's vice

president in charge of operations. The other was tall and slender with handsome and entirely expressionless features; he wore a Paratime Police officer's uniform, with the blue badge of hereditary nobility on his breast, and carried a sigma-ray needler in a belt holster.

"Were you waiting long, gentlemen?" Stranor Sleth asked. "I was holding Sunset Sacrifice up in the temple."

"No, we just got here," Brannad Klav said. "This is Verkan Vall, Mavrad of Nerros, special assistant to Chief Tortha of the Paratime Police, Stranor Sleth, our resident agent here."

Stranor Sleth touched hands with Verkan Vall.

"I've heard a lot about you, sir," he said. "Everybody working in paratime has, of course. I'm sorry we have a situation here that calls for your presence, but since we have, I'm glad you're here in person. You know what our trouble is, I suppose?"

"In a general way," Verkan Vall replied. "Chief Tortha, and Brannad Klav, have given me the main outline, but I'd like to have you fill in the details."

"Well, I told you everything," Brannad Klav interrupted impatiently. "It's just that Stranor's let this blasted local king, Kurchuk, get out of control. If I—" He stopped short, catching sight of the shoulder holster under Stranor Sleth's left arm. "Were you wearing that needler up in the temple?" he demanded.

"You're blasted right I was!" Stranor Sleth retorted. "And any time I can't arm myself for my own protection on this time-line, you can have my resignation. I'm not getting into the same jam as those people at Zurb."

"Well, never mind about that," Verkan Vall intervened. "Of course Stranor Sleth has a right to arm himself; I wouldn't think of being caught without a weapon on this time-line, myself. Now, Stranor, suppose you tell me what's been happening, here, from the beginning of this trouble."

"It started, really, about five years ago, when Kurchuk, the King of Zurb, married this Chuldun princess, Darith, from the country over beyond the Black Sea, and made her his queen, over the heads of about a dozen daughters of the local nobility, whom he'd married previously. Then he brought in this Chuldun scribe, Labdurg, and made him Overseer of the Kingdom—roughly, prime minister. There was a lot of dissatisfaction about that, and for a while it looked as though he was going to have a revolution on his hands, but he brought in about five thousand Chuldun mercenaries, all archers—these Hulguns can't shoot a bow worth beans—so the dissatisfaction died down, and so did most of the leaders of the disaffected group. The story I get is that this Labdurg arranged the marriage, in the first place. It looks to me as though the Chuldun emperor is intending to take over the Hulgung kingdoms, starting



with Zurb.

"Well, these Chulduns all worship a god called Muz-Azin. Muz-Azin is a crocodile with wings like a bat and a lot of knife blades in his tail. He makes this Yat-Zar look downright beautiful. So do his habits. Muz-Azin fancies human sacrifices. The victims are strung up by the ankles on a triangular frame and lashed to death with iron-barbed whips. Nasty sort of a deity, but this is a nasty time-line. The people here get a big kick out of watching these sacrifices. Much better show than our bunny-killing. The victims are usually criminals, or overage or incorrigible slaves, or prisoners of war.

"Of course, when the Chulduns began infiltrating the palace, they brought in their crocodile-god, too, and a flock of priests, and King Kurchuk let them set up a temple in the palace. Naturally, we preached against this heathen idolatry in our temples, but religious bigotry isn't one of the numerous imperfections of this sector. Everybody's deity is as good as anybody else's—indifferentism, I believe, is the theological term. Anyhow, on that basis things went along fairly well, till two years ago, when we had this run of bad luck."

"Bad luck!" Brannad Klav snorted. "That's the standing excuse of every incompetent!"

"Go on, Stranor; what sort of bad luck?" Verkan Vall asked.

"Well, first we had a drought, beginning in early summer, that burn-

ed up most of the grain crop. Then, when that broke, we got heavy rains and hailstorms and floods, and that destroyed what got through the dry spell. When they harvested what little was left, it was obvious there'd be a famine, so we brought in a lot of grain by conveyer and distributed it from the temples—miraculous gift of Yat-Zar, of course. Then the main office on First Level got scared about flooding this time-line with a lot of unaccountable grain and were afraid we'd make the people suspicious, and ordered it stopped.

"Then Kurchuk, and I might add that the kingdom of Zurb was the hardest hit by the famine, ordered his army mobilized and started an invasion of the Jum dun country, south of the Carpathians, to get grain. He got his army chopped up, and only about a quarter of them got back, with no grain. You ask me, I'd say that Labdurg framed it to happen that way. He advised Kurchuk to invade, in the first place, and I mentioned my suspicion that Chombrog, the Chuldun Emperor, is planning to move in on the Hulgund kingdoms. Well, what would be smarter than to get Kurchuk's army smashed in advance?"

"How did the defeat occur?" Verkan Vall asked. "Any suspicion of treachery?"

"Nothing you could put your finger on, except that the Jum duns seemed to have pretty good intelligence about Kurchuk's invasion route and battle plans. It could have been nothing worse than stupid tactics on Kur-

chuk's part. See, these Hulguns, and particularly the Zurb Hulguns, are spearmen. They fight in a fairly thin line, with heavy-armed infantry in front and light infantry with throwing-spears behind. The nobles fight in light chariots, usually at the center of the line, and that's where they were at this Battle of Jorm. Kurchuk himself was at the center, with his Chuldun archers massed around him.

"The Jumduns use a lot of cavalry, with long swords and lances, and a lot of big chariots with two javelin men and a driver. Well, instead of ramming into Kurchuk's center, where he had his archers, they hit the extreme left and folded it up, and then swung around behind and hit the right from the rear. All the Chuldun archers did was stand fast around the king and shoot anybody who came close to them; they were left pretty much alone. But the Hulgung spearmen were cut to pieces. The battle ended with Kurchuk and his nobles and his archers making a fighting retreat, while the Jumdun cavalry were chasing the spearmen every which way and cutting them down or lancing them as they ran.

"Well, whether it was Labdurg's treachery or Kurchuk's stupidity, in either case, it was natural for the archers to come off easiest and the Hulgung spearmen to pay the butcher's bill. But try and tell these knuckle-heads anything like that! Muz-Azin protected the Chulduns, and Yat-Zar let the Hulguns down, and that was all there was to it. The Zurb temple started losing wor-

shippers, particularly the families of the men who didn't make it back from Jorm.

"If that had been all there'd been to it, though, it still wouldn't have hurt the mining operations, and we could have got by. But what really tore it was when the rabbits started to die." Stranor Sleth picked up a cigar from his desk and bit the end, spitting it out disgustedly. "Tularemia, of course," he said, touching his lighter to the tip. "When that hit, they started going over to Muz-Azin in droves, not only at Zurb but all over the Six Kingdoms. You ought to have seen the house we had for Sunset Sacrifice, this evening! About two hundred, and we used to get two thousand. It used to be all two men could do to lift the offering box at the door, afterward, and all the money we took in tonight I could put in one pocket!" The high priest used language that would have been considered unclerical even among the Hulguns.

Verkan Vall nodded. Even without the quickie hypno-mech he had taken for this sector, he knew that the rabbit was domesticated among the Proto-Aryan Hulguns and was their chief meat animal. Hulgung rabbits were even a minor import on the First Level, and could be had at all the better restaurants in cities like Dhergabar. He mentioned that.

"That's not the worst of it," Stranor Sleth told him. "See, the rabbit's sacred to Yat-Zar. Not taboo; just sacred. They have to use

a specially consecrated knife to kill them—consecrating rabbit knives has always been an item of temple revenue—and they must say a special prayer before eating them. We could have got around the rest of it, even the Battle of Jorm—punishment by Yat-Zar for the sin of apostasy—but Yat-Zar just wouldn't make rabbits sick. Yat-Zar thinks too well of rabbits to do that, and it'd not been any use claiming he would. So there you are."

"Well, I take the attitude that this situation is the result of your incompetence," Brannad Klav began, in a bullyragging tone. "You're not only the high priest of this temple, you're the acknowledged head of the religion in all the Hulgum kingdoms. You should have had more hold on the people than to allow anything like this to happen."

"Hold on the people!" Stranor Sleth fairly howled, appealing to Verkan Vall. "What does he think a religion is, on this sector, anyhow? You think these savages dreamed up that six-armed monstrosity, up there, to express their yearning for higher things, or to symbolize their moral ethos, or as a philosophical escape-hatch from the dilemma of causation? They never even heard of such matters. On this sector, gods are strictly utilitarian. As long as they take care of their worshipers, they get their sacrifices; when they can't put out, they have to get out. How do you suppose these Chulduns, living in the Caucasus Mountains, got the idea of a god like a crocodile,

anyhow? Why, they got it from Homran traders, people from down in the Nile Valley. They had a god, once, something basically like a billy goat, but he let them get licked in a couple of battles, so out he went. Why, all the deities on this sector have hyphenated names, because they're combinations of several deities, worshiped in one person. Do you know anything about the history of this sector?" he asked the Paratime Police officer.

"Well, it develops from an alternate probability of what we call the Nilo-Mesopotamian Basic sector-group," Verkan Vall said. "On most Nilo-Mesopotamian sectors, like the Macedonian Empire Sector, or the Alexandrian-Roman or Alexandrian Punic or Indo-Turanian or Europo-American, there was an Aryan invasion of Eastern Europe and Asia Minor about four thousand elapsed years ago. On this sector, the ancestors of the Aryans came in about fifteen centuries earlier, as neolithic savages, about the time that the Sumerian and Egyptian civilizations were first developing, and overran all southeast Europe, Asia Minor and the Nile Valley. They developed to the bronze-age culture of the civilizations they overthrew, and then, more slowly, to an iron-age culture. About two thousand years ago, they were using hardened steel and building large stone cities, just as they do now. At that time, they reached cultural stasis. But as for their religious beliefs, you've described them quite accurately. A

god is only worshiped as long as the people think him powerful enough to aid and protect them; when they lose that confidence, he is discarded and the god of some neighboring people is adopted instead." He turned to Brannad Klav. "Didn't Stranor report this situation to you when it first developed?" he asked. "I know he did; he speaks of receiving shipments of grain by conveyer for temple distribution. Then why didn't you report it to Paratime Police? That's what we have a Paratime Police Force for."

"Well, yes, of course, but I had enough confidence in Stranor Sleth to think that he could handle the situation himself. I didn't know he'd gone slack—"

"Look, I can't make weather, even if my parishoners think I can," Stranor Sleth defended himself. "And I can't make a great military genius out of a blockhead like Kurchuk. And I can't immunize all the rabbits on this time-line against tularemia, even if I'd had any reason to expect a tularemia epidemic, which I hadn't because the disease is unknown on this sector; this is the only outbreak of it anybody's ever heard of on any Proto-Aryan time-line."

"No, but I'll tell you what you could have done," Verkan Vall told him. "When this Kurchuk started to apostatize, you could have gone to him at the head of a procession of priests, all paratiners and all armed with energy-weapons, and pointed out his spiritual duty to him, and if

he gave you any back talk, you could have pulled out that needler and rayed him down and then cried, 'Behold the vengeance of Yat-Zar upon the wicked king!' I'll bet any sum at any odds that his successor would have thought twice about going over to Muz-Azin, and none of these other kings would have even thought once about it."

"Ha, that's what I wanted to do!" Stranor Sleth exclaimed. "And who stopped me? I'll give you just one guess."

"Well, it seems there was slackness here, but it wasn't Stranor Sleth who was slack," Verkan Vall commented.

"Well! I must say; I never thought I'd hear an officer of the Paratime Police criticizing me for trying to operate inside the Paratime Transposition Code!" Brannad Klav exclaimed.

Verkan Vall, sitting on the edge of Stranor Sleth's desk, aimed his cigarette at Brannad Klav like a blaster.

"Now, look," he began. "There is one, and only one, inflexible law regarding outtime activities. The secret of paratime transposition must be kept inviolate, and any activity tending to endanger it is prohibited. That's why we don't allow the transposition of any object of extraterrestrial origin to any time-line on which space travel has not been developed. Such an object may be preserved, and then, after the local population begin exploring the planet from whence it came, there will be



dangerous speculations and theories as to how it arrived on Terra at such an early date. I came within inches, literally, of getting myself killed, not long ago, cleaning up the result of a violation of that regulation. For the same reason, we don't allow the export, to outtime natives, of manufactured goods too far in advance of their local culture. That's why, for instance, you people have to hand-finish all those big Yat-Zar idols, to remove traces of machine work. One of those things may be around, a few thousand years from now, when these people develop a mechanical civilization. But as far as raying down this Kurchuk is concerned, these Hulguns are completely nonscientific. They wouldn't have the least idea what happened. They'd believe that Yat-Zar struck him dead, as gods on this plane of culture are supposed to do, and if any of them noticed the needler at all, they'd think it was just a holy amulet of some kind."

"But the law is the law—" Brannad Klav began.

Verkan Vall shook his head. "Brannad, as I understand, you were promoted to your present position on the retirement of Salván Marth, about ten years ago; up to that time, you were in your company's financial department. You were accustomed to working subject to the First Level Commercial Regulation Code. Now, any law binding upon our people at home, on the First Level, is inflexible. It has to be. We found out, over fifty centuries

ago, that laws have to be rigid and without discretionary powers in administration in order that people may be able to predict their effect and plan their activities accordingly. Naturally, you became conditioned to operating in such a climate of legal inflexibility.

"But in paratime, the situation is entirely different. There exist, within the range of the Ghaldron-Hesthor paratemporal-field generator, a number of time-lines of the order of ten to the hundred-thousandth power. In effect, that many different worlds. In the past ten thousand years, we have visited only the tiniest fraction of these, but we have found everything from time-lines inhabited only by subhuman ape-men to Second Level civilizations which are our own equal in every respect but knowledge of paratemporal transposition. We even know of one Second Level civilization which is approaching the discovery of an interstellar hyperspatial drive, something we've never even come close to. And in between are every degree of savagery, barbarism and civilization. Now, it's just not possible to frame any single code of laws applicable to conditions on all of these. The best we can do is prohibit certain flagrantly immoral types of activity, such as slave-trading, introduction of new types of narcotic drugs, or out-and-out piracy and brigandage. If you're in doubt as to the legality of anything you want to do outtime, go to the Judicial Section of the Paratime

Commission and get an opinion on it. That's where you made your whole mistake. You didn't find out just how far it was allowable for you to go."

He turned to Stranor Sleth again. "Well, that's the background, then. Now tell me about what happened yesterday at Zurb."

"Well, a week ago, Kurchuk came out with this decree closing our temple at Zurb and ordering his subjects to perform worship and make money offerings to Muz-Azin. The Zurb temple isn't a mask for a mine; Zurb's too far south for the uranium deposits. It's just a center for propaganda and that sort of thing. But they have a House of Yat-Zar, and a conveyer, and most of the upper-priests are paratimers. Well, our man there, Tammand Drav, alias Khoram, defied the king's order, so Kurchuk sent a company of Chuldun archers to close the temple and arrest the priests. Tammand Drav got all his people who were in the temple at the time into the House of Yat-Zar and transposed them back to the First Level. He had orders"—Stranor Sleth looked meaningly at Brannad Klav—"not to resist with energy-weapons or even ultrasonic paralyzers. And while we're on the subject of letting the local yokels see too much, about fifteen of the under-priests he took to the First Level were Hulgún natives."

"Nothing wrong about that; they'll get memory-obliviation and pseudo-memory treatment," Verkan

Vall said. "But he should have been allowed to needle about a dozen of those Chulduns. Teach the beggars to respect Yat-Zar in the future. Now, how about the six priests who were outside the temple at the time? All but one were paratimers. We'll have to find out about them, and get them out of Zurb."

"That'll take some doing," Stranor Sleth said. "And it'll have to be done before sunset tomorrow. They are all in the dungeon of the palace citadel, and Kurchuk is going to give them to the priests of Muz-Azin to be sacrificed tomorrow evening."

"How'd you learn that?" Verkan Vall asked.

"Oh, we have a man in Zurb, not connected with the temple," Stranor Sleth said. "Name's Crannar Jurth; calls himself Kranjur, locally. He has a swordmaker's shop, employs about a dozen native journeymen and apprentices who hammer out the common blades he sells in the open market. Then, he imports a few high-class alloy-steel blades from the First Level, that'll cut through this local low-carbon armor like cheese. Fits them with locally-made hilts and sells them at unbelievable prices to the nobility. He's Swordsmith to the King; picks up all the inside palace dope. Of course, he was among the first to accept the New Gospel and go over to Muz-Azin. He has a secret room under his shop, with his conveyer and a radio.

"What happened was this: These six priests were at a consecration

ceremony at a rabbit-ranch outside the city, and they didn't know about the raid on the temple. On their way back, they were surrounded by Chuldun archers and taken prisoner. They had no weapons but their sacrificial knives." He threw another dirty look at Brannad Klav. "So they're due to go up on the triangles at sunset tomorrow."

"We'll have to get them out before then," Verkan Vall stated. "They're our people, and we can't let them down; even the native is under our protection, whether he knows it or not. And in the second place, if those priests are sacrificed to Muz-Azin," he told Brannad Klav, "you can shut down everything on this time-line, pull out or disintegrate your installations, and fill in your mine-tunnels. Yat-Zar will be through on this time-line, and you'll be through along with him. And considering that your fissionables franchise for this sector comes up for renewal next year, your company will be through in this paratime area."

"You believe that would happen?" Brannad Klav asked anxiously.

"I know it will, because I'll put through a recommendation to that effect, if those six men are tortured to death tomorrow," Verkan Vall replied. "And in the fifty years that I've been in the Police Department, I've only heard of five such recommendations being ignored by the commission. You know, Fourth Level Mineral Products Syndicate is after your franchise. Ordinarily, they wouldn't have a chance of getting it,

but with this, maybe they will, even without my recommendation. This was all your fault, for ignoring Stranor Sleth's proposal and for denying those men the right to carry energy weapons."

"Well, we were only trying to stay inside the Paratime Code," Brannad Klav pleaded. "If it isn't too late, now, you can count on me for every co-operation." He fiddled with some papers on the desk. "What do you want me to do to help?"

"I'll tell you that in a minute." Verkan Vall walked to the wall and looked at the map, then returned to Stranor Sleth's desk. "How about these dungeons?" he asked. "How are they located, and how can we get in to them?"

"I'm afraid we can't," Stranor Sleth told him. "Not without fighting our way in. They're under the palace citadel, a hundred feet below ground. They're spatially co-existent with the heavy water barriers around one of our company's plutonium piles on the First Level, and below surface on any unoccupied timeline I know of, so we can't transpose in to them. This palace is really a walled city inside a city. Here, I'll show you."

Going around the desk, he sat down and, after looking in the index-screen, punched a combination on the keyboard. A picture, projected from the microfilm-bank, appeared on the view-screen. It was an air-view of the city of Zurb-taken, the high priest explained, by

infrared light from an airboat over the city at night. It showed a city of an entirely pre-mechanical civilization, with narrow streets, lined on either side by low one- and two-story buildings. Although there would be considerable snow in winter, the roofs were usually flat, probably massive stone slabs supported by pillars within. Even in the poorer sections, this was true except for the very meanest houses and out-buildings, which were thatched. Here and there, some huge pile of masonry would rear itself above its lower neighbors, and, where the streets were wider, occasional groups of large buildings would be surrounded by battlemented walls. Stranor Sleth indicated one of the larger of these.

"Here's the palace," he said. "And here's the temple of Yat-Zar, about half a mile away." He touched a large building, occupying an entire block; between it and the palace was a block-wide park, with lawns and trees on either side of a wide roadway connecting the two.

"Now, here's a detailed view of the palace." He punched another combination; the view of the city was replaced by one, taken from directly overhead, of the walled palace area. "Here's the main gate, in front, at the end of the road from the temple," he pointed out. "Over here, on the left, are the slaves' quarters and the stables and workshops and storehouses and so on. Over here, on the other side, are the nobles' quarters. And this,"—he indicated a tow-

ering structure at the rear of the walled enclosure—"is the citadel and the royal dwelling. Audience hall on this side; harem over here on this side. A wide stone platform, about fifteen feet high, runs completely across the front of the citadel, from the audience hall to the harem. Since this picture was taken, the new temple of Muz-Azin was built right about here." He indicated that it extended out from the audience hall into the central courtyard." And out here on the platform, they've put up about a dozen of these triangles, about twelve feet high, on which the sacrificial victims are whipped to death."

"Yes. About the only way we could get down to the dungeons would be to make an airdrop onto the citadel roof and fight our way down with needlers and blasters, and I'm not willing to do that as long as there's any other way," Verkan Vall said. "We'd lose men, even with needlers against bows, and there's a chance that some of our equipment might be lost in the meleé and fall into outtime hands. You say this sacrifice comes off tomorrow at sunset?"

"That would be about actual sunset plus or minus an hour; these people aren't astronomers, they don't even have good sundials, and it might be a cloudy day," Stranor Sleth said. "There will be a big idol of Muz-Azin on a cart, set about here." He pointed. "After the sacrifice, it is to be dragged down this road, outside, to the temple of Yat-Zar, and

set up there. The temple is now occupied by about twenty Chuldun mercenaries and five or six priests of Muz-Azin. They haven't, of course, got into the House of Yat-Zar; the door's of impervium steel, about six inches thick, with a plating of collapsed nickel under the gilding. It would take a couple of hours to cut through it with our best atomic torch; there isn't a tool on this time-line that could even scratch it. And the insides of the walls are lined with the same thing."

"Do you think our people have been tortured, yet?" Verkan Vall asked.

"No." Stranor Sleth was positive. "They'll be fairly well treated, until the sacrifice. The idea's to make them last as long as possible on the triangles; Muz-Azin likes to see a slow killing, and so does the mob of spectators."

"That's good. Now, here's my plan. We won't try to rescue them from the dungeons. Instead, we'll transpose back to the Zurb temple from the First Level, in considerable force—say a hundred or so men—and march on the palace, to force their release. You're in constant radio communication with all the other temples on this time-line, I suppose?"

"Yes, certainly."

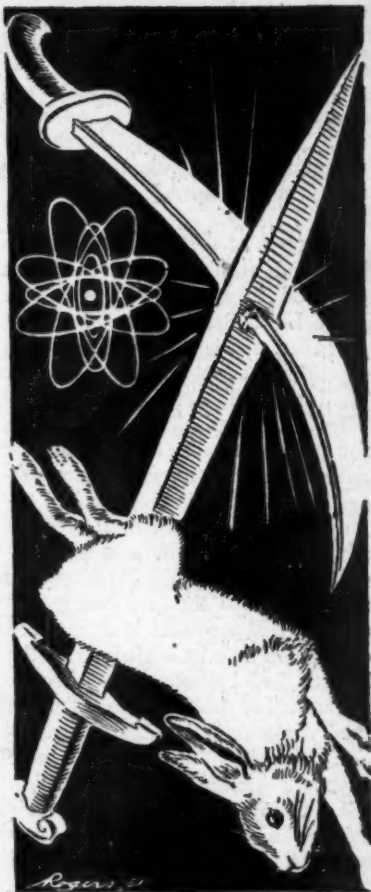
"All right. Pass this out to everybody, authority Paratime Police, in my name, acting for Tortha Karf. I want all paratimers who can possibly be spared to transpose to First Level immediately and rendezvous at the First Level terminal of the

Zurb temple conveyer as soon as possible. Close down all mining operations, and turn over temple routine to the native under-priests. You can tell them that the upper-priests are retiring to their respective Houses of Yat-Zar to pray for the deliverance of the priests in the hands of King Kurchuk. And everybody is to bring back his priestly regalia to the First Level; that will be needed." He turned to Brannad Klav. "I suppose you keep spare regalia in stock on the First Level?"

"Yes, of course; we keep plenty of everything in stock. Robes, miters, false beards of different shades, everything."

"And these big Yat-Zar idols; they're mass-produced on the First Level? You have one available now? Good. I'll want some alterations made on one. For one thing, I'll want it plated heavily, all over, with collapsed nickel. For another, I'll want it fitted with antigrav units and some sort of propulsion-units, and a loud-speaker, and remote control.

"And, Stranor, you get in touch with this swordmaker, Crannar Jurth, and alert him to co-operate with us. Tell him to start calling Zurb temple on his radio about noon tomorrow, and keep it up till he gets an answer. Or, better, tell him to run his conveyer to his First Level terminal, and bring with him an extra suit of clothes appropriate to the role of journeyman-mechanic. I'll want to talk to him, and furnish him with special equipment. Got all that? Well, carry on with it, and



bring your own paratimers, priests and mining operators, back with you as soon as you've taken care of everything. Brannad, you come with me, now. We're returning to First Level immediately. We have a lot of work

to do, so let's get started."

"Anything I can do to help, just call on me for it," Brannad Klav promised earnestly. "And, Stranor, I want to apologize. I'll admit, now, that I ought to have followed your recommendations, when this situation first developed."

By noon of the next day, Verkan Vall had at least a hundred men gathered in the big room at the First Level fissionables refinery at Jarnabar, spatially co-existent with the Fourth Level temple of Yat-Zar at Zurb. He was having a little trouble distinguishing between them, for every man wore the fringed blue robe and golden miter of an upper-priest, and had his face masked behind a blue false beard. It was, he admitted to himself, a most ludicrous-looking assemblage; one of the most ludicrous things about it was the fact that it would have inspired only pious awe in a Hulgün of the Fourth Level Proto-Aryan Sector. About half of them were priests from the Transtemporal Mining Corporation's temples; the other half were members of the Paratime Police. All of them wore, in addition to their temple knives, holstered sigma-ray needlers. Most of them carried ultrasonic paralyzers, eighteen-inch batonlike things with bulbous ends. Most of the Paratime Police and a few of the priests also carried either heat-ray pistols or neutron-disruption blasters; Verkan Vall wore one of the latter in a left-hand belt holster.

The Paratime Police were lined up separately for inspection, and Stranor Sleth, Tammand Drav of the Zurb temple, and several other high priests were checking the authenticity of their disguises. A little apart from the others, a Paratime Policeman, in high priest's robes and beard, had a square box slung in front of him; he was fiddling with knobs and buttons on it, practicing. A big idol of Yat-Zar, on antigravity, was floating slowly about the room in obedience to its remote controls, rising and lowering, turning about and pirouetting gracefully.

"Hey, Vall!" he called to his superior. "How's this?"

The idol rose about five feet, turned slowly in a half-circle, moved to the right a little, and then settled slowly toward the floor.

"Fine, fine, Horv," Verkan Vall told him, "but don't set it down on anything, or turn off the antigravity. There's enough collapsed nickel-plating on that thing to sink it a yard in soft ground."

"I don't know what the idea of that was," Brannad Klav, standing beside him, said. "Understand, I'm not criticizing. I haven't any right to, under the circumstances. But it seems to me that armoring that thing in collapsed nickel was an unnecessary precaution."

"Maybe it was," Verkan Vall agreed. "I sincerely hope so. But we can't take any chances. This operation has to be absolutely right. Ready, Tammand? All right; first detail into the conveyer."

He turned and strode toward a big dome of fine metallic mesh, thirty feet high and sixty in diameter, at the other end of the room. Tammand Drav, and his ten paratimer priests, and Brannad Klav, and ten Paratime Police, followed him in. One of the latter slid shut the door and locked it; Verkan Vall went to the control desk, at the center of the dome, and picked up a two-foot globe of the same fine metallic mesh, opening it and making some adjustments inside, then attaching an electric cord and closing it. He laid the globe on the floor near the desk and picked up the hand battery at the other end of the attached cord.

"Not taking any chances at all, are you?" Brannad Klav asked, watching this operation with interest.

"I never do, unnecessarily. There are too many necessary chances that have to be taken, in this work." Verkan Vall pressed the button on the hand battery. The globe on the floor flashed and vanished. "Yesterday, five paratimers were arrested. Any or all of them could have had door-activators with them. Stranor Sleth says they were not tortured, but that is a purely inferential statement. They may have been, and the use of the activator may have been extorted from one of them. So I want a look at the inside of that conveyer-chamber before we transpose into it."

He laid the hand battery, with the loose-dangling wire that had been left behind, on the desk, then lit a

cigarette. The others gathered around, smoking and watching, careful to avoid the place from which the globe had vanished. Thirty minutes passed, and then, in a queer iridescence, the globe reappeared. Verkan Vall counted ten seconds and picked it up, taking it to the desk and opening it to remove a small square box. This he slid into a space under the desk and flipped a switch. Instantly, a view-screen lit up and a three-dimensional picture appeared—the interior of a big room a hundred feet square and some seventy in height. There was a big desk and a radio; tables, couches, chairs and an arms-rack full of weapons, and at one end, a remarkably clean sixty-foot circle on the concrete floor, outlined in faintly luminous red.

"How about it?" Verkan Vall asked Tammand Drav. "Anything wrong?"

The Zurb high priest shook his head. "Just as we left it," he said. "Nobody's been inside since we left."

One of the policemen took Verkan Vall's place at the control desk and threw the master switch, after checking the instruments. Immediately, the paratemporal-transposition field went on with a humming sound that mounted to a high scream, then settled to a steady drone. The mesh dome flickered with a cold iridescence and vanished, and they were looking into the interior of a great fissionables refinery plant, operated by paratimers on another First Level time-line. The structural details al-

tered, from time-line to time-line, as they watched. Buildings appeared and vanished. Once, for a few seconds, they were inside a cool, insulated bubble in the midst of molten lead. Tammand Drav jerked a thumb at it, before it vanished.

"That always bothers me," he said. "Bad place for the field to go weak. I'm fussy as an old hen about inspection of the conveyer, on account of that."

"Don't blame you," Verkan Vall agreed. "Probably the cooling system of a breeder-pile."

They passed more swiftly, now, across the Second Level and the Third. Once they were in the midst of a huge land battle, with great tanklike vehicles spouting flame at one another. Another moment was spent in an air bombardment. On any time-line, this section of East Europe was a natural battleground. Once a great procession marched toward them, carrying red banners and huge pictures of a coarse-faced man with a black mustache—Verkan Vall recognized the environment as Fourth Level Europo-American Sector. Finally, as the transposition-rate slowed, they saw a clutter of miserable thatched huts, in the rear of a granite wall of a Fourth Level Hulgum temple of Yat-Zar—a temple not yet infiltrated by Transtemporal Mining Corporation agents. Finally, they were at their destination. The dome around them became visible, and an overhead green light flashed slowly on and off.

Verkan Vall opened the door and

stepped outside, his needler drawn. The House of Yat-Zar was just as he had seen it in the picture photographed by the automatic reconnaissance-conveyer. The others crowded outside after him. One of the regular priests pulled off his miter and beard and went to the radio, putting on a headset. Verkan Vall and Tammand Drav snapped on the visiscreen, getting a view of the Holy of Holies outside.

There were six men there, seated at the upper-priests' banquet table, drinking from golden goblets. Five of them wore the black robes with green facings which marked them as priests of Muz-Azin; the sixth was an officer of the Chuldun archers, in gilded mail and helmet.

"Why, those are the sacred vessels of the temple!" Tammand Drav cried, scandalized. Then he laughed in self-ridicule. "I'm beginning to take this stuff seriously, myself; time I put in for a long vacation. I was actually shocked at the sacrilege!"

"Well, let's overtake the infidels in their sins," Verkan Vall said. "Paralyzers will be good enough."

He picked up one of the bulb-headed weapons, and unlocked the door. Tammand Drav and another of the priests of the Zurb temple following and the others crowding behind, they passed out through the veils, and burst into the Holy of Holies. Verkan Vall pointed the bulb of his paralyzer at the six seated men and pressed the button; other paralyzers came into action, and the whole sextet were knocked senseless.

The officer rolled from his chair and fell to the floor in a clatter of armor. Two of the priests slumped forward on the table. The others merely sank back in their chairs, dropping their goblets.

"Give each one of them another dose, to make sure," Verkan Vall directed a couple of his own men. "Now, Tammand; any other way into the main temple beside that door?"

"Up those steps," Tammand Drav pointed. "There's a gallery along the side; we can cover the whole room from there."

"Take your men and go up there. I'll take a few through the door. There'll be about twenty archers out there, and we don't want any of them loosing any arrows before we can knock them out. Three minutes be time enough?"

"Easily. Make it two," Tammand Drav said.

He took his priests up the stairway and vanished into the gallery of the temple. Verkan Vall waited until one minute had passed and then, followed by Brannad Klav and a couple of Paratime Policemen, he went under the plinth and peered out into the temple. Five or six archers, in steel caps and sleeveless leather jackets sewn with steel rings, were gathered around the altar, cooking something in a pot on the fire. Most of the others, like veteran soldiers, were sprawled on the floor, trying to catch a short nap, except half a dozen, who crouched in a circle,

playing some game with dice—another almost universal military practice.

The two minutes were up. He aimed his paralyzer at the men around the altar and squeezed the button, swinging it from one to another and knocking them down with a bludgeon of inaudible sound. At the same time, Tammand Drav and his detail were stunning the gamblers. Stepping forward and to one side, Verkan Vall, Brannad Klav and the others took care of the sleepers on the floor. In less than thirty seconds, every Chuldun in the temple was incapacitated.

"All right, make sure none of them come out of it prematurely," Verkan Vall directed. "Get their weapons, and be sure nobody has a knife or anything hidden on him. Who has the syringe and the sleep-drug ampoules?"

Somebody had, it developed, who was still on the First Level, to come up with the second conveyer load. Verkan Vall swore. Something like this always happened, on any operation involving more than half a dozen men.

"Well, some of you stay here; patrol around, and use your paralyzers on anybody who even twitches a muscle." Ultrasonics were nice, effective, humane police weapons, but they were unreliable. The same dose that would keep one man out for an hour would paralyze another for no more than ten or fifteen minutes. "And be sure none of them are playing 'possum.'"

He went back through the door

under the plinth, glancing up at the decorated wooden screen and wondering how much work it would take to move the new Yat-Zar in from the conveyers. The five priests and the archer-captain were still unconscious; one of the policemen was searching them.

"Here's the sort of weapons these priests carry," he said, holding up a short iron mace with a spiked head. "Carry them on their belts." He tossed it on the table, and began searching another knocked-out hierophant. "Like this— Hey! Look at this, will you!"

He drew his hand from under the left side of the senseless man's robe and held up a sigma-ray needler. Verkan Vall looked at it and nodded grimly.

"Had it in a regular shoulder holster," the policeman said, handing the weapon across the table. "What do you think?"

"Find anything else funny on him?"

"Wait a minute." The policeman pulled open the robe and began stripping the priest of Muz-Azin; Verkan Vall came around the table to help. There was nothing else of a suspicious nature.

"Could have got it from one of the prisoners, but I don't like the familiar way he's wearing that holster," Verkan Vall said. "Has the conveyer gone back, yet?" When the policeman nodded, he continued: "When it returns, take him to the First Level. I hope they bring up the sleep-drug with the next load. When

you get him back, take him to Dhergabar by strato-rocket immediately, and make sure he gets back alive. I want him questioned under narco-hypnosis by a regular Paratime Commission psycho-technician, in the presence of Chief Tortha Karf and some responsible Commission official. This is going to be hot stuff."

Within an hour, the whole force was assembled in the temple. The wooden screen had presented no problem—it slid easily to one side—and the big idol floated on anti-gravity in the middle of the temple. Verkan Vall was looking anxiously at his watch.

"It's about two hours to sunset," he said, to Stranor Sleth. "But as you pointed out, these Hulguns aren't astronomers, and it's a bit cloudy. I wish Crannar Jurth would call in with something definite."

Another twenty minutes passed. Then the man at the radio came out into the temple.

"O. K.!" he called. "The man at Crannar Jurth's called in. Crannar Jurth contacted him with a midget radio he has up his sleeve; he's in the palace courtyard now. They haven't brought out the victims, yet, but Kurchuk has just been carried out on his throne to that platform in front of the citadel. Big crowd gathering in the inner courtyard; more in the streets outside. Palace gates are wide open."

"That's it!" Verkan Vall cried. "Form up; the parade's starting. Brannad, you and Tammand and Stranor and I in front; about ten

men with paralyzers a little behind us. Then Yat-Zar, about ten feet off the ground, and then the others. Forward—*ho-o!*”

They emerged from the temple and started down the broad roadway toward the palace. There was not much of a crowd, at first. Most of Zurb had flocked to the palace earlier; the lucky ones in the courtyard and the late comers outside. Those whom they did meet stared at them in open-mouthed amazement, and then some, remembering their doubts and blasphemies, began howling for forgiveness. Others—a substantial majority—realizing that it would be upon King Kurchuk that the real weight of Yat-Zar’s six hands would fall, took to their heels, trying to put as much distance as possible between them and the palace before the blow fell.

As the procession approached the palace gates, the crowds were thicker, made up of those who had been unable to squeeze themselves inside. The panic was worse, here, too. A good many were trampled and hurt in the rush to escape, and it became necessary to use paralyzers to clear a way. That made it worse; everybody was sure that Yat-Zar was striking sinners dead left and right.

Fortunately, the gates were high enough to let the god through without losing altitude appreciably. Inside, the mob surged back, clearing a way across the courtyard. It was only necessary to paralyze a few here, and the levitated idol and its

priestly attendants advanced toward the stone platform, where the king sat on his throne, flanked by court functionaries and black-robed priests of Muz-Azin. In front of this, a rank of Chuldun archers had been drawn up.

“Hov; move Yat-Zar forward about a hundred feet and up about fifty,” Verkan Vall directed. “Quickly!”

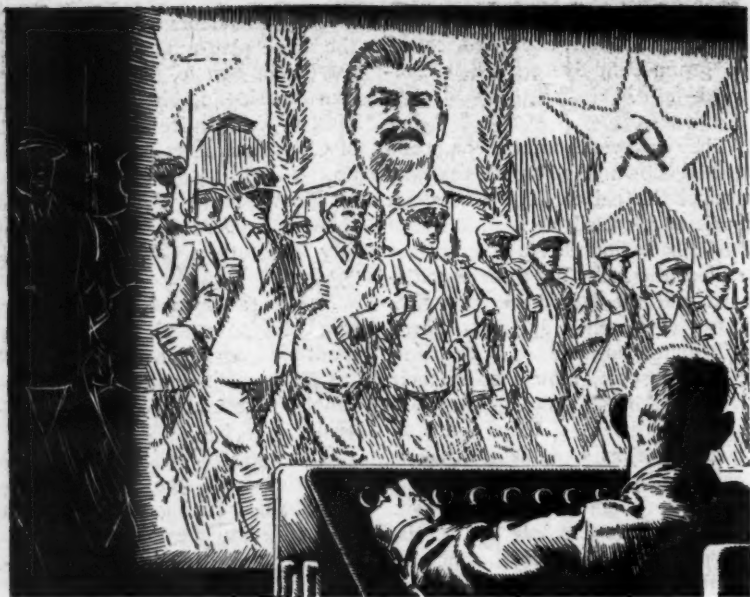
As the six-armed anthropomorphic idol rose and moved closer toward its saurian rival, Verkan Vall drew his needler, scanning the assemblage around the throne anxiously.

“*Where is the wicked King?*” a voice thundered—the voice of Stranor Sleth, speaking into a midget radio tuned to the loud-speaker inside the idol. “*Where is the blasphemer and desecrator, Kurchuk?*”

“There’s Labdurg, in the red tunic, beside the throne,” Tammand Drav whispered. “And that’s Ghromdur, the Muz-Azin high priest, beside him.”

Verkan Vall nodded, keeping his eyes on the group on the platform. Ghromdur, the high priest of Muz-Azin, was edging backward and reaching under his robe. At the same time, an officer shouted an order, and the Chuldun archers drew arrows from their quivers and fitted them to their bowstrings. Immediately, the ultrasonic paralyzers of the advancing paratimers went into action, and the mercenaries began dropping.

“*Lay down your weapons, fools!*”



the amplified voice boomed at them. *"Lay down your weapons or you shall surely die! Who are you, miserable wretches, to draw bows against Me?"*

At first a few, then all of them, the Chulduns lowered or dropped their weapons and began edging away to the sides. At the center, in front of the throne, most of them had been knocked out. Verkan Vall was still watching the Muz-Azin high priest intently; as Ghromdur raised his arm, there was a flash and a puff of smoke from the front of Yat-Zar—the paint over the collapsed nickel was burned off, but other-

wise the idol was undamaged: Verkan Vall swung up his needler and rayed Ghromdur dead; as the man in the green-faced black robes fell, a blaster clattered on the stone platform.

"Is that your puny best, Muz-Azin?" the booming voice demanded. *"Where is your high priest now?"*

"Horv; face Yat-Zar toward Muz-Azin," Verkan Vall said over his shoulder, drawing his blaster with his left hand. Like all First Level people, he was ambidextrous, although, like all paratimers, he habitually concealed the fact while out-time. As the levitated idol swung slowly to look down upon its enemy



on the built-up cart, Verkan Vall aimed the blaster and squeezed.

In a spot less than a millimeter in diameter on the crocodile idol's side, a certain number of neutrons in the atomic structure of the stone from which it was carved broke apart, becoming, in effect, atoms of hydrogen. With a flash and a bang, the idol burst and vanished. Yat-Zar gave a dirty laugh and turned his back on the cart, which was now burning fiercely, facing King Kurchuk again.

"Get your hands up, all of you!" Verkan Vall shouted, in the First Level language, swinging the stubby muzzle of the blaster and the knob-tipped twin tubes of the needler to

cover the group around the throne. "Come forward, before I start blasting!"

Labdurg raised his hands and stepped forward. So did two of the priests of Yat-Zar. They were quickly seized by Paratime Policemen who swarmed up onto the platform and disarmed. All three were carrying sigma-ray needlers, and Labdurg had a blaster as well.

King Kurchuk was clinging to the arms of his throne, a badly frightened monarch trying desperately not to show it. He was a big man, heavy-shouldered, black-bearded; under

ordinary circumstances he would probably have cut an imposing figure, in his gold-washed mail and his golden crown. Now his face was a dirty gray, and he was biting nervously at his lower lip. The others on the platform were in even worse state. The Hulgum nobles were grouped together, trying to disassociate themselves from both the king and the priests of Muz-Azin. The latter were staring in a daze at the blazing cart from which their idol had just been blasted. And the dozen men who were to have done the actual work of the torture-sacrifice had all dropped their whips and were fairly gibbering in fear.

Yat-Zar, manipulated by the robed paratimer, had taken a position directly above the throne and was lowering slowly. Kurchuk stared up at the massive idol descending toward him, his knuckles white as he clung to the arms of his throne. He managed to hold out until he could feel the weight of the idol pressing on his head. Then, with a scream, he hurled himself from the throne and rolled forward almost to the edge of the platform. Yat-Zar moved to one side, swung slightly and knocked the throne toppling, and then settled down on the platform. To Kurchuk, who was rising cautiously on his hands and knees, the big idol seemed to be looking at him in contempt.

"Where are my holy priests, Kurchuk?" Stranor Sleth demanded in to his sleeve-hidden radio. "Let them be brought before me, alive and un-

harmd, or it shall be better for you had you never been born!"

The six priests of Yat-Zar, it seemed, were already being brought onto the platform by one of Kurchuk's nobles. This noble, whose name was Yorzuk, knew a miracle when he saw one, and believed in being on the side of the god with the heaviest artillery. As soon as he had seen Yat-Zar coming through the gate without visible means of support, he had hastened to the dungeons with half a dozen of his personal retainers and ordered the release of the six captives. He was now escorting them onto the platform, assuring them that he had always been a faithful servant of Yat-Zar and had been deeply grieved at his sovereign's apostasy.

"Hear my word, Kurchuk," Stranor Sleth continued through the loud-speaker in the idol. "You have sinned most vilely against me, and were I a cruel god, your fate would be such as no man has ever before suffered. But I am a merciful god; behold, you may gain forgiveness in my sight. For thirty days, you shall neither eat meat nor drink wine, nor shall you wear gold nor fine raiment, and each day shall you go to my temple and beseech me for my forgiveness. And on the thirty-first day, you shall set out, barefoot and clad in the garb of a slave, and journey to my temple that is in the mountains over above Yoldav, and there will I forgive you, after you have made sacrifice to me. I, Yat-Zar, have spoken!"

The king started to rise, babbling thanks.

"Rise not before me until I have forgiven you!" Yat-Zar thundered. *"Creep out of my sight upon your belly, wretch!"*

The procession back to the temple was made quietly and sedately along an empty roadway. Yat-Zar seemed to be in a kindly humor; the people of Zurb had no intention of giving him any reason to change his mood. The priests of Muz-Azin and their torturers had been flung into the dungeon. Yorzuk, appointed regent for the duration of Kurchuk's penance, had taken control and was employing Hulgün spearmen and hastily-converted Chuldun archers to restore order and, incidentally, purge a few of his personal enemies and political rivals. The priests, with the three prisoners who had been found carrying First Level weapons among them and Yat-Zar floating triumphantly in front, entered the temple. A few of the devout, who sought admission after them, were told that elaborate and secret rites were being held to cleanse the profaned altar, and sent away.

Verkan Vall and Brannad Klav and Stranor Sleth were in the conveyer chamber, with the Paratime Policemen and the extra priests; along with them were the three prisoners. Verkan Vall pulled off his false beard and turned to face these. He could see that they all recognized him.

"Now," he began, "you people

are in a bad jam. You've violated the Paratime Transposition Code, the Commercial Regulation Code, and the First Level Criminal Code, all together. If you know what's good for you, you'll start talking."

"I'm not saying anything till I have legal advice," the man who had been using the local alias of Labdurg replied. "And if you're through searching me, I'd like to have my cigarettes and lighter back."

"Smoke one of mine, for a change," Verkan Vall told him. "I don't know what's in yours beside tobacco." He offered his case and held a light for the prisoner before lighting his own cigarette. "I'm going to be sure you get back to the First Level alive."

The former Overseer of the Kingdom of Zurb shrugged. "I'm still not talking," he said.

"Well, we can get it all out of you by narco-hypnosis, anyhow," Verkan Vall told him. "Besides, we got that man of yours who was here at the temple when we came in. He's being given a full treatment, as a presumed outtime native found in possession of First Level weapons. If you talk now, it'll go easier with you."

The prisoner dropped the cigarette on the floor and tramped it out.

"Anything you cops get out of me, you'll have to get the hard way," he said. "I have friends on the first Level who'll take care of me."

"I doubt that. They'll have their hands full taking care of themselves, after this gets out." Verkan Vall

turned to the two in the black robes. "Either of you want to say anything?" When they shook their heads, he nodded to a group of his policemen; they were hustled into the conveyer. "Take them to the First Level terminal and hold them till I come in. I'll be along with the next conveyer load."

The conveyer flashed and vanished. Brannad Klav stared for a moment at the circle of concrete floor from whence it had disappeared. Then he turned to Verkan Vall.

"I still can't believe it," he said. "Why, those fellows were First Level paratimers. So was that priest, Ghromdur; the one you rayed."

"Yes, of course. They worked for your rivals, the Fourth Level Mineral Products Syndicate; the outfit that was trying to get your Proto-Aryan Sector fissionables franchise away from you. They operate on this sector already; have the petroleum franchise for the Chuldun country, east of the Caspian Sea. They export to some of these internal-combustion-engine sectors, like Europo-American. You know, most of the wars they've been fighting, lately, on the Europo-American Sector have been, at least in part, motivated by rivalry for oil fields. But now that the Europo-Americans have begun to release nuclear energy, fissionables have become more important than oil. In less than a century, it's predicted that atomic energy will replace all other forms of

power. Mineral Products Syndicate wanted to get a good source of supply for uranium, and your Proto-Aryan Sector franchise was worth grabbing.

"I had considered something like this as a possibility when Stranor, here, mentioned that tularemia was normally unknown in Eurasia on this sector. That epidemic must have been started by imported germs. And I knew that Mineral Products has agents at the court of the Chuldun emperor, Chombrog; they have to, to protect their oil wells on his eastern frontiers. I spent most of last night checking up on some stuff by video-transcription from the Paratime Commission's microfilm library at Dhergabar. I found out, for one thing, that while there is a King Kurchuk of Zurb on every time-line for a hundred parayears on either side of this one, this is the only time-line on which he married a Princess Darith of Chuldu, and it's the only time-line on which there is any trace of a Chuldun scribe named Labdurg.

"That's why I went to all the trouble of having that Yat-Zar plated with collapsed nickel. If there were disguised paratimers among the Muz-Azin party at Kurchuk's court, I expected one of them to try to blast our idol when we brought it into the palace. I was watching Ghromdur and Labdurg in particular; as soon as Ghromdur used his blaster, I needed him. After that, it was easy."

"Was that why you insisted on

sending that automatic viewer on ahead?"

"Yes. There was a chance that they might have planted a bomb in the House of Yat-Zar, here. I knew they'd either do that or let the place entirely alone. I suppose they were so confident of getting away with this that they didn't want to damage the conveyer or the conveyer chamber. They expected to use them, themselves, after they took over your company's franchise."

"Well, what's going to be done about it by the Commission?" Brannad Klav wanted to know.

"Plenty. The syndicate will probably lose their paratime license; any of its officials who had guilty knowledge of this will be dealt with according to law. You know, this was a pretty nasty business."

"You're telling me!" Stranor Sleth exclaimed. "Did you get a look at those whips they were going to use on our people? Pointed iron bars a quarter-inch long braided into them, all over the lash-ends!"

"Yes. Any punitive action you're thinking about taking on these priests of Muz-Azin—the natives, I mean—will be ignored on the First Level. And that reminds me; you'd better work out a line of policy, pretty soon."

"Well, as for the priests and the torturers, I think I'll tell Yorzuk to have them sold to the Bhunguns, to the east. They're always in the market for galley slaves," Stranor Sleth said. He turned to Brannad Klav.

"And I'll want six gold crowns made up, as soon as possible. Strictly Hulgung design, with Yat-Zar religious symbolism, very rich and ornate, all slightly different. When I give Kur-chuk absolution, I'll crown him at the altar in the name of Yat-Zar. Then I'll invite in the other five Hulgung kings, lecture them on their religious duties, make them confess their secret doubts, forgive them, and crown them, too. From then on, they can all style themselves as ruling by the will of Yat-Zar."

"And from then on, you'll have all of them eating out of your hand," Verkan Vall concluded. "You know, this will probably go down in Hulgung history as the Reformation of Ghullam the Holy. I've always wondered whether the theory of the divine right of kings was invented by the kings, to establish their authority over the people, or by the priests, to establish *their* authority over the kings. It works about as well one way as the other."

"What I can't understand is this," Brannad Klav said. "It was entirely because of my respect for the Paratime Code that I kept Stranor Sleth from using Fourth Level weapons and other techniques to control these people with a show of apparent miraculous powers. But this Fourth Level Mineral Products Syndicate was operating in violation of the Paratime Code by invading our franchise area. Why didn't they fake up a supernatural reign of terror to intimidate these natives?"

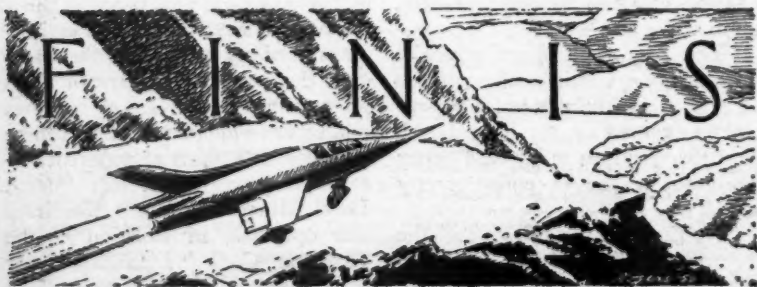
"Ha, exactly because they *were*

operating illegally," Verkan Vall replied. "Suppose they had started using needlers and blasters and anti-gravity and nuclear-energy around here. The natives would have thought it was the power of Muz-Azin, of course, but what would you have thought? You'd have known, as soon as they tried it, that First Level paratimers were working against you, and you'd have laid the facts before the Commission, and this time-line would have been flooded with Paratime Police. They had to conceal their operations not only from the natives, as you do, but also from us. So they didn't dare make public use of First Level techniques.

"Of course, when we came marching into the palace with that idol on antigravity, they knew, at once, what was happening. I have an idea that they only tried to blast that idol to

create a diversion which would permit them to escape—if they could have got out of the palace, they'd have made their way, in disguise, to the nearest Mineral Products Syndicate conveyer and transposed out of here. I realized that they could best delay us by blasting our idol, and that's why I had it plated with collapsed nickel. I think that where they made their mistake was in allowing Kur-chuk to have those priests arrested, and insisting on sacrificing them to Muz-Azin. If it hadn't been for that, the Paratime Police wouldn't have been brought into this, at all.

"Well, Stranor, you'll want to get back to your temple, and Brannad and I want to get back to the First Level. I'm supposed to take my wife to a banquet in Dhergabar, tonight, and with the fastest strato-rocket, I'll just barely make it."



THE PEDDLER'S NOSE

BY JACK WILLIAMSON

He was a peddler, and not quite ethical, and didn't quite understand Earth — which had never contacted the Galactic Empire knowingly. And most particularly, he didn't know what his nose knew . . .

Illustrated by Cartier

The peddler came to Earth, across the empty immensities of space, after whisky. He knew the planet was under quarantine, but his blunders had left him at the mercy of his thirst. Ultimately, the root of that merciless thirst was his nose.

He was a thin, tiny man, and his crooked nose enormous. The handicap could have been corrected, but he was born on a frontier world where the difficult dilemmas of freedom and responsibility had not yet been solved, and he was allowed to grow up twisted with the knowledge of his ugliness.

Damned by genetic accident, he spent his life in flight from salvation. By the time his deformity had made a petty criminal of him, he had come to defend it as the most tender part

of himself. When he was ordered to a clinic for the removal of his social maladjustments and the excess nasal tissue that lay beneath them, he escaped rehabilitation and drifted out to the fringes of civilization, where the law was less efficient.

Never bold, he settled at last into the shabby occupation of vending cheap novelty toys. Even that humble calling had its risks. He had been forced to make his pitch without a vendor's license, on the last world behind, and he had to leave it in such haste that he had no time to buy his usual supplies.

His nerves were not so good as they had been. Aboard the flier, he had to gulp down three stiff drinks before his hands were steady enough to set the automatic pilot. And the

raw alcohol seemed to hit him more swiftly than common, so that his vision began to blur and double before he had finished the adjustments.

In his frightened befuddlement, he mistook an 8 for a 3, and overlooked a decimal point, and turned the planet selector dial one space too far. His intended goal had been another frontier world, a few light-years away, where immigration was still unrestricted and the pioneers still hardy enough to let their children buy his toys. His errors, however, made Earth his destination.

The robot pilot warned him instantly. Although the flier had been battered and abused by several generations of outlaws bolder than himself, it had saved him many times from destruction, and it was still a sturdy, spaceworthy neutrionic craft. A gong crashed. A red light flickered above the competent mechanism, and it spoke to him sternly:

"Caution! Do not take off. Destination dialed is far beyond normal operating range. Caution! Check charts and dials for possible error. Caution!"

He was normally cautious enough, but those three drinks had magnified his panic. Already too far gone to understand the warning, he stabbed a shaky finger at the button that canceled it. Before he could find the take-off lever, however, the signals rang and flashed again.

"Caution!" rapped that hard mechanical voice. "Do not take off. Destination dialed is under quarantine. All contact prohibited—"

Impatiently, too drunk to think of anything except escape, he pulled the take-off lever. The signals stopped, and the flier took him to Earth, across a distance in light-centuries that might have staggered a sober man.

Human civilization was an expanding globe, spreading out through the galaxy at almost half the speed of light, as the colonists hopped from star to star; and that long flight took him from what was then the outside of it, back toward the half-forgotten center.

The voyage wasn't long to him, however, and the flier required no more attention. It caught the invisible winds of radiant neutrinos that rise out of the novae to blow forever through the galaxies, and it was swept away at such a speed that time was slowed almost to a stop for everything aboard, through the working of relativity.

The peddler drank and slept and dreamed uneasy dreams of men with scalpels who wanted to remove his nose. He woke and slept and drank again, until his inadequate supplies were gone.

As originally built, the flier would have identified itself to the destination port authority, waited for orders, and obeyed them automatically. Previous owners had changed the operating circuits, however, so that it slipped down dark toward the night side of Earth, with all signals dead except a gong to arouse its master.

The peddler awoke unhappy. Even



the dimmed lights in his untidy little cabin seemed intolerably bright, and the gong was bursting his head. He shuffled hastily to stop it and then stumbled through the flier in search of something to drink.

There should have been another bottle cached somewhere, against such emergencies, behind his berth or in his portable sales case or perhaps in the empty medical cabinet—he had long ago bartered its contents for whisky.

But the caches had all been raided before. Muttering bitterly, shaken with a thirst that refused to wait, he staggered back to the cockpit and touched a dial to find out where he was.

Sol Three—he had never heard of that. He shook his throbbing head,

and squinted at the hooded screen to read his position. The co-ordinates took his breath. He was two thousand light-years from the last world he remembered, somewhere near the dead center of civilization.

He felt shocked for an instant at the vastness of his blunder. Yet there was no harm done. That was the unique advantage of his nomadic existence. No matter how many outraged citizens wanted to remodel his nose and extirpate his thirst, the flier had always carried him safely beyond their reach, across space and trackless time.

He leaned hopefully to read the screen again. Sol Three was a minor member of an undistinguished planetary system, it told him, with nothing to interest either tourist or

trader. The inhabitants were human, but their culture was primitive. Although long settled, the planet was historically unimportant. A footnote caught his eye:

The planet was once believed to have been the site of Atlantis, the half legendary cradle of civilization, from which the interstellar migrations began. Although the comparative biology of the indigenous fauna supports this idea, no actual historical proof has yet been found, and the low cultural level of the present inhabitants leaves it open to question—

He wasn't concerned with the elaborate quarrels of the historians. All he wanted was a drink. Just one stiff jolt, to cut the foul taste out of his mouth and sweep the pain from his head and quiet his trembling limbs. Even this planet couldn't be too backward, he thought, to distill alcohol.

Thirstily, he touched the landing key.

The gong rang instantly, painful as a hammer on his head. The red light flickered, and the loud recorded voice of the automatic pilot rang grimly:

"Warning! Do not attempt to land. This planet is quarantined, under the Covenants of Non-Contact. All communication is absolutely prohibited, and violators will be subject to full rehabilitation. Warning—"

Cringing from the voice and the gong, he stabbed frantically at the cancellation button. Because primitive worlds offered the easiest mar-

ket for his goods, he had run into the Covenants before. He knew they were intended to prevent the damaging clash of peoples at discrepant levels of social evolution, but he was not interested in theories of cultural impact.

What he wanted was a drink, and he should find it here. Although he had never heard of Sol Three, he knew his trade and he was well enough equipped. One quick stand ought to bring the price of what he needed for the long flight back to the frontier worlds where he felt at home. Even if something aroused the quarantine officials, their threat of full rehabilitation was unlikely to pursue him quite that far.

He pushed the landing key. The flier slipped down silently, before dawn, to the dark slope of a wooded hill three miles from a feeble energy source that should be a small settlement. He inflated the covering membrane that gave the craft the look of an innocent boulder, and started walking toward the settlement with his sales equipment.

The cool air had a refreshing scent of things growing. The feel of the grass was good underfoot, and the voices of small wild creatures made an elusive music. No wilderness had ever seemed so friendly. He thought this planet had really been the birthplace of mankind, and he felt happy for a moment with a mystical sense of return.

But he hadn't come for communion with the mother world, and that brief elation slipped away as he began to

worry about meeting some primitive taboo against the use of alcohol.

Frowning with anxiety, he came to an empty road at the foot of the hill and tramped along it with an apprehensive haste toward a rude concrete bridge across a shallow stream. The sun was rising now, not much different from any other star. It showed him a wide green valley where a herd of black-and-white domestic animals grazed peacefully and a man in blue groved a crude traction plow.

The peddler paused for a moment, feeling a puzzled contempt for the stupid yokels who lived their small lives rooted here, as ignorant of the great world outside as their fat cattle were. If envy lay beneath his scorn, he didn't know it.

The sunlight had begun to hurt his eyes and his thirst shook him again with a dry paroxysm. He limped grimly on. Beyond the bridge, he found crude two-dimensional signs set up along the road. He had no equipment to read their silent legends, but even the flat pictures of sealed bottles and dew-wet glasses spoke to him with a maddening eloquence.

At the summit of a gentle hill, he came upon a wooden hut enveloped in a thin but tantalizing fragrance of alcohol. The sign above the door convinced him that it was a public place, and a faded poster on the wall showed a plump native girl sipping a drink seductively.

He tried the door eagerly, but it was locked. The teasing odor tempted him to break in, but he shrank from

the impulse fearfully. Running the quarantine was crime enough. He didn't want to be rehabilitated, and he thought the place would surely open by the time he could supply himself with the local medium of exchange.

Already perspiring, he went on down the hill toward the village. It lay along a bend of the quiet stream he had passed: a scattered group of rude brick and stucco family huts standing in a grove of trees. It looked so different from the brawl and glitter of the raw pioneer cities he had known that he halted uncertainly.

He wasn't used to dealing with such simple races. But then his novelties would certainly be new to their children, and the occasional discarded cans and bottles beside the road assured him that alcohol was abundant. That was really all that mattered. He mopped his face and swung the sales case to his left hand and staggered on again.

"Mornin' to you, mister."

Startled by that unexpected hail, he darted to the side of the road. A clumsy primitive vehicle had come up behind him. It was driven by some kind of crude heat engine, which gave off a faint reek of burning petroleum. A large man sat at the control wheel, watching him with a disturbing curiosity.

"Lookin' for somebody in Chatsworth?"

The man spoke a harsh-sounding tongue he had never heard before, but the psionic translator, a tiny de-

vice no more conspicuous than the native's hearing aid, brought the meaning to him instantly.

"Mornin' to you, mister." He lifted his arm a little, murmuring toward the microphone hidden in his sleeve, and his translated reply came from the tiny speaker under his clothing, uttered in a nasal drawl that matched the native's.

"Thanks," he said, "but I'm just passing through."

"Then hop in." The native leaned to open the door of the vehicle. "I'll give you a lift out to my place, a mile across the town."

He got in gratefully, but in a moment he was sorry for his eagerness.

"Welcome to Chatsworth," the grinning yokel went on. "Population three-hundred and four, in the richest little valley in the state. Guess I've got the right to make you welcome." The tall man chuckled. "I'm Jud Hankins. The constable."

Now sweat broke out on the peddler's dusty face. His head throbbed unbearably, and his gnarled old hands began trembling so violently that he had to grip the handle of his case to keep the officer from noticing his agitation.

In a moment, however, he saw that this unfortunate chance encounter with the law had not yet been disastrous. Jud Hankins was unlikely to be concerned with enforcing the Covenants—if he ever knew that they existed.

"Pleased to meet you, Mr. Hankins," the peddler answered hastily, grateful that the translator

failed to reproduce the apprehensive tremor in his voice. "My name's Gray."

He noticed the constable looking at his sales case.

"A fertile valley, indeed!" he said hurriedly. "Do you produce grain for the distilling industry?"

"Mostly for hogs." The constable glanced at the case again. "You a salesman, Mr. Gray?"

Uneasily, he said he was.

"What's your line, if you don't mind?"

"Toys," he said. "Novelty toys."

"I was just afraid you had fireworks." The constable seemed faintly relieved. "I thought I ought to warn you."

"Fireworks?" The peddler repeated the term in a puzzled voice, because the translation had not been entirely clear.

"The Fourth will soon be coming up, you know," the constable explained. "We've got to protect the children." He grinned proudly. "I've four fine little rascals of my own."

The peddler still wasn't sure about fireworks. The Fourth was obviously some sort of barbaric ceremonial at which children were sacrificed, and fireworks were probably paraphernalia for the witch doctors. Anyhow, it didn't matter.

"These toys are all I sell," he insisted. "They're highly educational. Designed and recommended by child training experts, to instruct while they amuse. Safe enough for children in the proper age groups."

He squinted sharply at the amiable constable.

"But I'm not sure about offering them here," he added uneasily. "In so small a place, it might not pay me to buy a license."

"You don't need one." The constable chuckled disarmingly. "You see, we aren't incorporated. Another point of our sort of town. Go ahead and sell your toys—just so they're nothing that will hurt the children."

He slowed the vehicle to call a genial greeting to a group of children playing ball on a vacant lot, and stopped in the village to let a boy and his dog cross the street ahead. The peddler thanked him, and got out hastily.

"Wait, Mr. Gray," he protested. "You had breakfast?"

The peddler said he hadn't.

"Then jump in again," the jovial native urged. "Mamie has plenty on the table—she cooks it up while I do the chores out on the farm. Seeing you're doing business in town, I want you to come out and eat with us."

"Thanks," he said, "but all I want is something to drink."

"I guess you are dry, walking in this dust." The native nodded sympathetically. "Come on out, and we'll give you a drink."

Tempted by that promise and afraid of offending the law, he got back in the machine. The constable drove on to a neat, white-painted hut at the edge of the village. Four noisy children ran out to welcome them,

and a clean, plump-faced woman met them at the door.

"My wife," the constable drawled jovially. "Mr. Gray. A sort of early-bird Santa Claus, he says, with toys for the kiddies. He'd like a drink."

The peddler came into the kitchen section of the hut, which looked surprisingly clean. He reached with a trembling anxiety for the drink the woman brought him. It had the bright clear color of grain alcohol, and he almost strangled, in his bitter surprise, when he found that it was only cold water.

He thanked the woman as civilly as he could manage, and said he had to go. The children were clamoring to see his toys, however, and the constable urged him to stay for breakfast. He sat down reluctantly and sipped at a cup of hot bitter liquid called coffee, which really seemed to help his headache.

Still afraid of the friendly constable, he made excuses not to show the toys until the children had to leave for school. The smallest girl began to sneeze and sniffle, as the mother herded them toward the door, and he inquired with some alarm what was wrong.

"Just a cold," the woman said. "Nothing serious."

That puzzled him for an instant, because the weather seemed quite warm. Probably another error in translation, but nothing to alarm him. He was rising to follow the children outside, but the woman turned back to him.

"Don't go yet, Mr. Gray." She

smiled kindly. "I'm afraid you aren't well. You hardly touched your ham and eggs. Let me get you another cup of coffee."

He sat down again unwillingly. Perhaps he wasn't well, but he expected to feel worse until he had a drink of something better than cold water.

"Can't we do something for him, Jud?" The woman had turned to her husband. "He doesn't look able to be out on the road alone, without a soul to do for him. Can't you think of something?"

"Well—" The constable set fire to the end of a small white tube, and inhaled the smoke with a reflective expression. "We still don't have a janitor at the school. I'm a trustee, and I'll say a word to the principal if you want the job."

"And you could stay here with us," the woman added eagerly. "There's a nice clean bed in the attic. Your board won't cost a cent, so long as you're willing to do a few odd jobs around the place. Would you like that?"

He squinted at her uncertainly. To his own surprise, he wanted to stay. He wasn't used to kindness, and it filled his eyes with tears. The infinite chasm of open space seemed suddenly even more dark and cold and dreadful than it was, and for an instant he hungered fiercely for the quiet peace of this forgotten world. Perhaps its still spell would hold him and heal all his restless discontent.

"You're welcome here," the constable was urging. "And if you've got

a business head, you can find more than odd jobs to do. You'll never find a likelier spot than Chatsworth, if you want to settle down."

"I don't know." He picked up his empty cup, absently. "I'm really glad you want me, but I'm afraid it's been too long—"

He stopped, flinching, when he saw the woman looking at his nose. Her eyes fell, as if out of pity, but in a moment she spoke.

"I . . . I do hope you'll let us help you, Mr. Gray." She hesitated again, her plump face flushed, and he began to hate her. "I've a brother in the city who's a plastic surgeon," she went on resolutely. "He has turned a lot of . . . well, misfits . . . into very successful people. He's really very good, and not high at all. If you decide to stay, I think we can manage something."

He set the empty cup down quickly, because his hands were shaking again. He was still alert enough to recognize the old trap, even in this charming guise. He didn't want to be rehabilitated, and he meant to keep his nose.

"Well, Mr. Gray?" the constable was drawling. "Want to see the principal?"

"I'd like to." He grinned wanely, to cover his shuddering panic. "If you'll just show me where to find him. And you've both been very kind."

"Don't mention it," the constable said. "I'm driving back to the farm, and I'll take you by the school."

But he didn't talk to the principal. He had seen the trap, and he was still crafty enough to escape it. He started walking toward the building as the constable drove away, limping along as soberly as if he had already been rehabilitated, but he stopped outside, behind a hedge, to make his pitch.

He unlocked the battered case and set it up on the extended legs and lighted the three-dimensional displays. The children gathered on the playground were already pausing in the games to look at him, and when the psionic music began they flocked around him instantly.

His toys were the cheapest possible trinkets, mass-produced from common materials, but they were cleverly packaged and their ingenious designs reflected the advanced technology of the industrial planet where they were made. The small plastic boxes were gay with universal psionic labels, which reacted to attention with animated stereo-color scenes and changing labels which seemed to be printed in each looker's own language.

"Come in closer, kiddies!"

He picked up the first little pile of round red boxes and began juggling them with a sudden dexterity in his twisted old fingers, so that they rose and fell in time to the racing psionic melody.

"Look, kiddies! A wonderful educational toy. Use it to demonstrate the great basic principles of meteorology and neutrionics. And surprise your friends.

"The Little Wonder Weather Wizard Blizzard Maker Set! It works by turning part of the heat energy of the air for several miles around into radiant neutrinos. The sudden chilling causes precipitation, and the outflow of cold air creates a brief but effective blizzard—the label tells you all about it.

"Step right up, kiddies! Buy 'em at a bargain price. Only twenty-five cents each, or three for half a dollar—"

"But we really shouldn't, mister." The boy who interrupted looked familiar, and he recognized the constable's oldest son. "All most of us have is our lunch money, and we aren't supposed to spend it."

"Don't you worry, kid," he answered quickly. "Even if you go home hungry, you'll have your money's worth. You never saw any toys like these. Only fifteen cents, to close 'em out. Come right up and buy 'em now, because I won't be here tomorrow."

He scooped up the coins from grubby little hands.

"But don't start making storms just now," he warned hastily. "We don't want trouble with the teachers, do we, kiddies? Better keep 'em in your pockets until school is out. Sorry, sonny. That's all the blizzard makers—but look at this!"

He picked up the next stack of small plastic boxes.

"The Junior Giant Degravitator Kit! A fascinating experiment in gravitational inversion. Learn the facts of basic science, and amaze your



friends. The label shows you all about it."

He began passing out the boxes. The bright psionic labels looked blank at first, but they came to shining life under the eyes of the children, responding to the thoughts of each. Most of them pictured the harmless degeneration of such small objects as marbles and tadpoles, but he glimpsed one showing how to connect the device to the foundations of the school building and another in which the astonished principal himself was falling upward toward open space.

"Wait a moment, sonny!" he whispered hurriedly. "Let's not degenerate anything until after school is out. Sorry, laddie. That's all the Junior Giants, but here's something else

that's just as educational, and really better fun."

He held up a Great Detective Annihilator Pistol-Pencil.

"It looks like an ordinary writing instrument, but the eraser really erases! It converts solid matter into invisible neutrinos. All you do is point it and press the clip. You can blow holes in walls, and make objects disappear, and fool your friends. All for one thin dime!"

The school bell began to ring as he handed out the annihilators and gathered up the dimes.

"Just one more item, kiddies, before you go to class." He turned up the psionic amplifier, and raised his rusty voice. "Something I know you're all going to want. An exciting experiment, with real atomic en-

ergy, that you can try at home!"

He poured bright little spheres out of a carton into the palm of his hand.

"Look at 'em, kiddies! Planet Blaster Fusion Bomb Capsules, Super-Dooper Size. All you do is drop one capsule in a bucket of water and wait for it to dissolve. The reaction fuses the hydrogen atoms in the water into helium—the free instruction leaflet tells you how the same reaction makes the stars shine.

"Buy 'em now, before you go to class. Add realism to your playground battles, and flabbergast your friends. Make your own fusion bombs. Only five cents each. Three for a dime, if you buy 'em now—"

"Say, mister." The constable's son had bought three capsules, but now he stood peering at them uneasily. "If these little pills make real atom bombs, aren't they dangerous, even more than fireworks?"

"I wouldn't know about fireworks." The peddler scowled impatiently. "But these toys are safe enough, if you've had your psionic preconditioning. I hope you all know enough not to set off fusion bombs indoors!"

He laughed at the bewildered boy, and lifted his rasping voice.

"Your last chance, kiddie! I won't be here when you get out of school, but right now these genuine fusion bomb capsules are going two for a nickel. One for two cents, sonny, if that's all you've got."

He swept in the last sweaty coppers.

"And that's all, kiddies." He turned out the shimmering displays and stopped the psionic music and folded up the stand. The children filed into the schoolhouse, and he hurried back across the village.

The tavern on the hill was open when he came back to it, and the scent of alcohol brought back all his thirst, so intense that his whole body shuddered. He was spreading out his money on the bar, when a blare of native music startled him.

The raw notes sawed at his nerves, too loud and queerly meaningless. He turned to scowl at the bulky machine from which they came, wondering what made them seem so flat and dead. After a moment of puzzled annoyance, he realized that the music was sound alone, with no psionic overtones.

Were these people ignorant of psionics? It seemed impossible that even the Covenants of Non-Contact could exclude all knowledge of such a basic science, yet now when he thought of it he couldn't recall seeing any psionic device at all. The bartender ought to know.

"Well, mister, what will you have?"

"Tell me," he whispered huskily, "do your schools here teach psionics?"

The man's startled expression should have been answer enough, but he wasn't looking at it. He had seen his own reflection in the mirror behind the bar. The hard, narrow bloodless face. The shrinking chin.

The shifty, hollowed, bloodshot eyes. And the huge, crooked nose.

"Huh?" The bartender was staring. "What did you say?"

But his voice was gone. If these people didn't know psionics, anything he said would give him away. The flier would be discovered, and he could never leave. He would be rehabilitated. White and weak with panic, he pushed the heap of coins across the bar.

"Whisky!" he gasped. "All this will buy."

The bartender took an endless time to count the coins, but they bought six bottles. He crammed them into the empty case, and hurried out of the bar. And he came at last, footsore and dusty, back across the bridge and up the hills where he had left the flier.

His breath sobbed out when he stumbled through the trees and saw the empty spot beyond the rock. Dismay shook him. He thought the flier was gone, until he turned and recognized its inflated camouflage. Trembling with a sick weakness, he found the psionic key and tried to deflate the membrane.

The key didn't work.

He tried again, but still the distended fabric remained hard as actual rock. He ran frantically around it, trying the key against a dozen different spots. None of them responded. He was locked out.

He couldn't understand it, and he had to have a drink. He had been trying to wait until he was safe aboard, with his new destination

dialled on the automatic pilot, but suddenly he felt too tired and cold and hopeless to make any effort without the warming aid of alcohol. He couldn't even think.

He stooped to open the sales case, where he had put the whisky, but the psionic key failed again. It fell out of his fingers, when he realized what was wrong. Psionic and neutronic devices seldom got out of order, but they could be disabled. The flier must have been discovered by somebody from the quarantine station.

Sick with panic, he tried to get away. He dropped the case and ran blindly off into the unfamiliar wilderness. His staggering flight must have led him in a circle, however, for at last he came reeling back to a hill and a rock that looked the same. His head was light with illness by that time, his twitching limbs hot with fever.

He was clawing feebly at the stiffened membrane, hopelessly trying to tear it away with his bleeding fingers, when he heard firm footsteps behind him and turned to see the stolid, sunburned figure of Constable Jud Hankins.

"Well, constable." He leaned giddily back against the camouflage, grinning with a sick relief that this was not a quarantine inspector. His translator failed to work at first, but it spoke for him as he fumbled to adjust the instrument under his clothing.

"I give up," he muttered dully. "I'll go back with you." A chill be-

gan to shake him, and his raw throat felt too painful for speech. "I'm ready to settle down—if they'll only leave my nose alone."

There was something else he ought to say, but his ears were roaring and his bones ached and he could barely stand. He felt too sick for a moment to remember anything, but at last it came back to him.

"The toys—" he sobbed. "They're dangerous!"

"Not any longer," the tall man told him curtly. "We slapped psionic and neutronic inhibitors on this whole area, to prevent accidents, before I borrowed the identity of Constable Hankins to pick them up."

"You—" He stared blankly. "You are—"

"A quarantine inspector, from Sol Station." The officer flashed a psionic badge. "You were detected before you landed. We delayed the arrest to be certain you had no confederates."

He felt too ill to be astonished.

"You've got me," he mumbled faintly. "Go ahead and give me full rehabilitation."

"Too late for that." The stern man straightened impatiently. "You're all alike, you quarantine breakers. You always forget that cultural impacts strike both ways. You never understand that the Covenants exist partly for your own protection."

He shook his throbbing head.

"I know you were not processed through our clinic at the station," the inspector rapped. "I see you didn't even bring a medical kit. I'd bet you landed here, among a people so primitive that malignant micro-organisms are allowed to breed among them, with no protection for yourself whatever."

"Clinic?" The one word was all he really caught, but he stiffened defensively. "You can do what else you like," he whispered doggedly. "But I mean to keep my nose."

"You've bigger troubles now." The inspector studied him regretfully. "I suppose our ancestors were naturally immune, the way these people are, but I'd be dead in half a day if I hadn't been immunized against a thousand viruses and germs. You've already picked them up."

He stood wheezing for his breath, squinting painfully against the light.

"The people I met were well enough," he protested stupidly. "One child had something called a cold, but the woman said it wasn't dangerous."

"Not to her," the inspector said. "No more than atomic fusion bombs are to you."

Uncomprehending, he swayed and fell.

THE END



Illustrated by Rogers

"Old Doc Arlich is getting obsessions," Fred Morrison's rasping voice said through a mouthful of doughnut. "Now that his precious Sewing Machine has killed white mice, rabbits, hamsters, covies, rhesus monkeys, and dogs, he figures it's about time to try it on human beings. He was in my office yesterday—" Fred paused for a swallow of coffee.

"Doc's Sewing Machine," was a nickname familiarly applied around the Atomic Generating Plant, to the much-publicized but little understood Temporally Integrated Gamma Energy Reactor, known to the alphabet boys in Washington as TIGER. The Plant nickname arose from an address Dr. Arlich had once delivered, on certain declassified aspects of his experiments, before

some learned society or other. In explaining that the intent of the experiments was not to "warp" time, not to disturb its normal continuity, Dr. Arlich had used the simile of a tuck in a piece of fabric. The fabric, he explained, was not cut and overlapped, as in a seam; the surface of the fabric was intact and continuous despite the tuck. But the passenger, the experimental animal, was intended to pass over the right side of the garment, as it were, in an un-interrupted path which did not touch the tucked-in portion of time.

The newspapers had promptly seized upon Dr. Arlich's "tuck in time" and changed it to a "stitch in time." In either case, the disrespectful appellation "Sewing Machine" for the hulking bulk of equipment,

A STITCH IN TIME

BY SYLVIA JACOBS

A new author presents a slight problem — the problem of TIGER, the unintentional time machine, whose workings only a sixty-year-old infant understood!

was inevitable.

Now Dr. George Arlich pressed his short, pudgy self against the thin pre-fab wall between his laboratory closet and the Plant cafeteria. He didn't make a habit of eavesdropping on the gossip that went on over the office staff's morning cup of coffee, he had come into the closet merely to get his coat. But he paused, his puffy, usually pale face, flushed in hypertension anger, as he heard the vicious thrust from Morrison, whom he had hated for ten bitter years.

Morrison's first offense; never forgiven, had been to try to argue his comely young assistant fingerprint expert, Stephanie Bowers, out of marrying a man over twice her age. Stephanie had been only eighteen, then, but she had a mind of her own, and she knew what she wanted.

Dr. Arlich had been at the top of the heap, then a key scientist head-

ing a project that absorbed a large chunk of Uncle's money, his pudgy person and his shining equipment guarded by Secret Service men. That was when Dr. Arlich worked honorably, in broad daylight, surrounded by assistants. That was when everybody believed TIGER was doing what it was built to do, that it was the weapon to end weapons, when everybody waited confidently for the reappearance of the experimental animals placed in the chamber.

Now Dr. Arlich kept vigil alone, coming down to the Plant only at night, checking and re-checking his calculations. The Government appropriation had been reduced to the vanishing point, leaving only what amounted to a pension for Arlich. Security precautions had been lifted, until little more than the construction of TIGER itself was secret. Dr. Arlich's once-spacious do-

main had been cut into by the cafeteria extension.

"Nobody knows for sure the animals are dead," put in a baritone voice Arlich did not recognize. "They just disappeared. How do we know the machine didn't really take a stitch in time? How do we know the animals didn't really travel into the future, so far ahead that none of us will be here when they show up again?"

"Gibberish," Morrison retorted. "Time travel is a paradox. Impossible. The animals disintegrated. Some kind of disintegration we don't understand, that released no energy to correspond with the mass. What good is a process like that? It won't run any turbines."

"Maybe you could use it to dispose of garbage," the baritone voice suggested. "I read a story once—" A ripple of high-pitched feminine laughter rewarded the witticism. Some stenographer must be in the group.

Dr. Arlich's futile rage turned against his wife. She was responsible for his being here at this hour, doomed to listen to this stupid prattle. Stephanie had needed the heliocar, last night, it was one of her three volunteer shifts a week at the hospital pediatrics ward. She must have overslept this morning, and was later than usual calling for her husband.

The girl who had been laughing in the cafeteria remarked. "Tell us more about Doc putting people in

his Sewing Machine, Fred. Who on earth could he use? The Government wouldn't let him send a condemned criminal into the future; the thing just *might* work, by accident. And who else could just drop out of sight? People don't disappear as easily as they used to, back in 1950 or so."

"That's just the point," Fred Morrison said, "who wouldn't have fingerprinted cards marked with his whereabouts, filed with the Population Identification for Defense Dispersal Unit in Washington, and the branch Units? Why do you suppose Doc Arlich came pumping me for information when he hates my guts? He knows I trained with the Unit, that's how I got the Identification job here. Wouldn't I be the one man in the Plant who would know who could disappear?"

"All right," the man who had been cracking jokes put in flippantly, "I'll bite. Who *could* disappear?"

"Babies!" Morrison announced in a sepulchral tone.

Dr. Arlich, in his closet, stiffened. Babies, indeed! Where had Fred Morrison picked up such a notion? What conceivable advantage would there be in experimenting with a baby, instead of an animal? An adult, now, might possibly perform some voluntary act at some stage of the process to facilitate the experiment, such as opening the inner clamps of the chamber—

"But babies are fingerprinted the minute they're born, by every hos-

pital in the country," the girl objected.

"What about babies born outside hospitals?" Fred asked. "Some still are, you know—illegitimate babies, or those that come too soon, out in the country some place. A baby like that might be six months old before the Unit investigators officially recorded its existence and whereabouts. When—"

A booming voice that hadn't spoken before interrupted him. "Don't you think this has gone far enough, Fred? If you think you have something that ought to be looked into, I don't keep any dragons in my outer office, you know. You don't have to nail me at breakfast—"

It sounded like Bob Schilling, the Plant super, Arlich thought miserably. But couldn't he summon a better defense of an old friend than that? Tell all the lies you want, just so you don't disturb my breakfast!

The wit who got a laugh before seemed unwilling to relinquish the floor. He improvised gaily,

*There was a small baby from Niger,
Who took a time ride in a TIGER,
Ten years of the ride
Found no baby inside
Just a smile on the dial of the TIGER.*

The girl giggled, but Fred Morrison insisted, "Look, Bob, you may pass it off lightly, but in my opinion, the old bird ought to be watched. He's had enough shocks to knock him off his rocker."

"You mean like all the wolf-

whistles that gorgeous wife of his leaves in her wake?" the wit inquired. "Say, there's an idea, maybe the reason they don't have any kids, and her so crazy about kids, is that her old man stuffs 'em in his Sewing Machine as soon as they're born."

"Will-ie!" the girl squealed admiringly. "I think you're *awful*!"

"There's no mystery about that," Fred said. "What do you expect with a girl of twenty-eight married to a man of sixty? Oh, I don't question that plenty of men of sixty, or seventy, or eighty, for that matter, are potent. I don't think he's been exposed to enough radiation to make him sterile, any more than anybody else in the Plant. He just worries too much over his work, eats too much, and exercises too little. He didn't look like a well man when she married him, and I told her so. But she wouldn't listen. She was bound and determined to perpetuate what she called his genius into the next generation!"

"And then it turned out he couldn't do her any good after all?" the wit inquired maliciously. "Boy, I sure could!"

"Who couldn't?" said Bob Schilling's booming voice.

The phrase triggered something in Doc's mind, and suddenly he could take no more. Clutching his coat, he stumbled out of the closet, and half-fell across his laboratory desk. Bob Schilling! The man who had done more than anyone else to bring TIGER to the attention of the

Secretary of Defense! Bob Schilling, who had been accepted as a friend, in the Arlich home! There was hardly a good-looking man of their acquaintance George Arlich hadn't looked at searchingly in the past ten years, thinking, "Will he be the one who takes her away from me?" But not Bob! He had never suspected Bob!

Such triggerings powered the sequence of events that Dr. Arlich vainly sought to foresee. An accidental phrasing here, a misinterpretation there, stirring the ferment of human emotions, awakening angry memories, producing improbable results. If a tired and defeated man, had not trusted a younger man as his friend, or had stayed to learn that trust was justified, TIGER would not have howled that night, and mankind, limited by the brevity of human life, might still be chained to the solar system, might never have reached the stars—

"Who couldn't?" Bob Schilling said. "But who would? There's a little question of ethics involved, isn't there? And, speaking of ethics, is Doc's private life any of our business? Fred, can't you take a hint, and continue this conversation, if it's worth continuing, in private? Do I have to embarrass us both by making noises like a top sergeant? Miss Evans, Bill, will you excuse us, now?"

"Why cer-tainly, Mr. Schilling!" the girl said coquettishly.

"Gee," she sighed, after the two

men had left the cafeteria, "isn't he a swell guy, though?"

"He sure is. He treats everybody like they were people, instead of just the hired help around here. That old tartar I used to have for a boss, would have taken Fred apart, limb by limb, if he didn't like the way Fred is always shooting off his mouth."

"You should talk! You were kicking it around plenty yourself, even after he let on he didn't like it."

"Aw, what's the use of having a guy like Bob, if you can't act natural around him, if you can't crack a joke once in a while?" Willie, or Bill, demanded. "Say, do you really think Doc is crazy?"

"I think he's handsome, too, don't you?" the girl asked dreamily. "I wonder why he's not married yet?"

"Who's handsome? Doc?"

"Of course not, silly."

"Why don't you quit carrying the torch for a guy that'll never give you a tumble, and pay some attention to me once in a while? You got to admit, Doc acts funny, never talks to anybody or anything."

"Well," the girl conceded, "I guess anybody would have to be kind of crazy, to dream up a time machine in the first place."

"Yeah," Bill agreed, "all those scientists are kind of crazy. Why don't they work on something practical, like atomics?"

Getting no response to her light knock, Stephanie opened the laboratory door and came in. Seeing the

drooping lines of her husband's shoulders, as he sat at the laboratory desk, his head buried in his arms, she dropped her purse and ran to him, crying, "George, George, what's the matter?"

Dr. Arlich raised his head. His tired eyes were glazed in a denial of all emotion. He looked at his wife as if he did not recognize her. Stooping, she wrapped her arms about his shoulders, comforting him as she might a child—or, he thought bitterly, a father.

"Oh, George, you gave me a shock," she whispered. "You were just sleeping, weren't you? I thought for a moment you were ill. Dear, you stick too closely to this place. It isn't good for you. Why don't we take a Lunar trip this summer? Surely you can get someone you trust to watch it for you." She gestured toward the Temporal Reactor, crouching hugely in the vaulted loft beyond the open laboratory door.

Doc ran his fat hand over the bald crown of his head. The fringe of hair left around the edges, was the same color it had always been. He was not really an old man, only a weary and puzzled one.

"It's no use," he said. "I couldn't get away from it. It would always be with me, wherever I went. I would want to rush back, to see whether anything had appeared in the chamber. That's the only thing that could cure what's wrong with me. The only thing could cure what's wrong with us."

"I know," she said. "Don't stop

believing in it, George. We just have to be patient, no matter how impatient other people are. You told me yourself, the reason all the other Temporal Reactors failed, is because they attempted to send something a few seconds, or a few microseconds, into the future, as a starter, and the reaction is not capable of close adjustment. Why should you become so depressed, then, if you cannot predict the time within ten years? It's only a confirmation of your own theory."

"I know something important has happened," he said. "Only I can't tell them exactly what has happened, because I don't know. Let's go home, Stephanie."

In the corridor, they passed Bob Schilling, on his way back to his office from the Identification room. Morrison was not with him.

"Hi, people," he called out cheerfully.

Doc grunted, hating the admiring glance Bob cast at the new way Stephanie had done her gleaming dark hair, the new custom-molded spring suit she was wearing.

"Well, Bob!" Stephanie replied, "long time no see!"

A lie, Doc wondered, or an invitation? No, he had no excuse to think such thoughts of her.

In the car, on the way home, she chatted about the hospital. "There's the sweetest little boy in the ward, six and a half. He was terribly burned, playing with matches. They're going to save him, but the poor child is miserably uncomfortable."

able; they can take away the actual pain, of course, but it is so hard on him, having to lie still, swathed in bandages. He couldn't sleep last night, and I told him every story I knew, and made up some new ones."

"I hope you told him one about what happens to little boys who play with matches," Doc said sourly.

"He's an incurable experimenter," Stephanie said. "He has learned that people who want to find out the truth of things for themselves sometimes get hurt, but I don't think it will stop him from experimenting. I hope not."

Doc said little as they lifted out to the suburbs, but when the car dropped to their own driveway, he spoke.

"Stephanie," he said, "my pre-occupation . . . our marriage, is unfair to you. Maybe nothing can be done for me, but how about you? Why don't you at least adopt a child?"

The electric eye activated the trap, and the car was lowered into the basement. "No," Stephanie said, "you don't understand, George. I don't want just any baby, I want your baby. Your work is taking longer than you expected. Even after your theory is demonstrated, that will be only the beginning. Then you will have to send a whole chamber into the future, to make the return trip. Your equipment will have to be built on a much larger scale. Somebody will have to carry on for you. I haven't given up my

project, George, any more than you have yours."

"The biologic dice game will probably louse up your experiment for you anyway," Doc said sourly. "If we do have a child, he will probably resemble my father, who considered it sacrilegious to add anything to the sum total of human knowledge."

"You're in a bad mood this morning," Stephanie said. "You need some sleep."

But sleep did not come, in the air-conditioned, windowless bedroom, though Doc had long accustomed himself to sleeping in the daytime, and all his life had been better able to work at night. The damaging gossip he had heard through the plastic partition, kept coming back to him. When he went back to his laboratory that evening, he was still undecided whether to try to fight it, or forget it. Either course seemed impossible.

As he walked through the deserted office wing of the Plant to his laboratory, Doc passed the door of the Identification Bureau, with Fred Morrison's name lettered on it. There was the guinea pig, Doc thought vindictively, he would like to stuff into the small chamber of the giant TIGER, with perhaps his witty friend as a traveling companion. Maybe the future could cope with him.

From long force of habit, Doc hung up his coat in the laboratory closet, with his watch in the pocket, before approaching any equipment

that might magnetize the old-fashioned gold watch. He put on the white, radiation-reflecting clothes that were standard in the Plant, though this wing was thoroughly shielded from the pile. Then he made his routine check of the chamber. A watchman checked it visually through the quartz porthole every hour during the day, but only Doc was permitted to open the port. That regulation dated from the year some wag of a watchman had put a white mouse into the chamber, without throwing the switches. The news got on the press-service wires, before Doc discovered that the mouse did not have the identifying brand of the first animal placed in the chamber when TIGER was built.

Doc had punched some tapes the night before, that he had intended to feed into the calculator tonight. But he was very tired, after his sleepless day. He wanted to curl up some place and go to sleep. But he was hyper-sonic, and the cleaning women had the built-in vacuum cleaning system operating in the offices. As he gazed into the empty chamber of TIGER, it occurred to him that it was soundproof, though not very roomy for a man with an ample stomach.

Suddenly, he had a curious sensation that reminded him of nothing so much as his first experience, when he was an undergraduate, with an electronic calculator. An answer that would have taken many hours of conscious work, had been fed to him without effort on his part. This was

a very similar experience, though the computer was an instrument far superior to any man-made device; his own mind. He had not consciously tried to solve the problems confronting him; he had seen no way of arriving at a solution. But the equations had been punched into the tape nevertheless, and now the solution was fed out to him, as clearly as if it were typed on paper.

If it were twenty years from now, or thirty or even fifteen, and he were still sixty years old, his problems would no longer exist. In twenty years, Stephanie would be forty-eight; people would not be particularly sorry for her, because she was married to a man of sixty. Vicious gossip concerning the failure of TIGER and questioning his own sanity, would evaporate, for his own existence as a man of sixty in a period twenty years hence, would prove that TIGER worked.

He had never before considered using himself as a guinea pig, for the simple reason that his presence at the operating end of the machine, had been essential. It had always been assumed that that main job would not be the actual investigation of the future; any reasonably intelligent adult—babies indeed, Doc thought!—could presumably determine where the probability curve was most susceptible to influence, once it was proved that living creatures could survive the trip.

If machinery were operating in the future, capable of returning the

traveler—which seemed unlikely, since no indication of its existence had arrived at the present—any adult could find it and persuade the authorities to let him use it. If no such machinery were operating—and Doc saw no paradox in that, the power sources supplying TIGER itself might well be obsolete or destroyed twenty years hence, leaving only the virtually indestructible chamber—then the key job—Doc's job—was the building of a dual-chamber capable of bringing the investigator back. If he himself were to go into the future, with no equipment for return, it would automatically eliminate any possibility of his being of assistance to the people of today.

But now that no longer seemed to matter. The people of today no longer asked for his help—they had cast TIGER out of their hopes. The appearance of a time-transported mouse would revive their interest, but suppose that took another twenty years? By then, Doc would be eighty, perhaps past helping anyone.

And what if the experimental animals were dead, disintegrated, as Morrison and others believed, what if they had not passed into the future at all? Well, that, too, would be a solution of sorts. If that were true, Doc himself had little incentive to live, to listen to more people call TIGER a failure, to watch the inevitable wreck of his marriage, as he became increasingly feeble, with his wife still in vigorous maturity.

The only equipment lacking, was a jury rig to trigger the controls, after he himself entered the chamber. Rummaging through a box of odds and ends, he found he had his choice of two possible methods of doing the job, without calling on a machinist. He decided on the cracked shaving mirror, in preference to the rusty bell crank, and went to work, humming an old, old tune he had learned from his grandmother, "Time Changes Everything."

He felt almost cheerful as he worked. It was all so beautifully simple. Either TIGER accomplished the purpose for which it was intended, or the time-trip was lethal. And though his mind was trained to logic, he had dealt so long with these two alternatives, that it did not occur to him that there might be a third. The ghosts of scientists before him stood and watched sardonically—scientists who, seeking one natural law, stumbled by accident upon another, the creators of accidents comprised of one part training, one part careful observation, one part equipment.

Stephanie—would she feel badly? Not for long, Doc thought. Perhaps he would be declared legally dead, and she would remarry, raise a family. Her children would be almost grown when he saw her again, instant after next. He could reclaim her, with proof that he had never been dead at all. Would she still be beautiful? She would always be that

to him, he thought, even if, by some freak, he should take a longer stitch in time than the present version of TIGER was designed for, and reappear when she was over sixty—older than he.

Yet, he wanted to see her once more, as she was now. Picking up the V. P. receiver on his desk, he dialed his home number. For a long moment, before flipping the switch that would enable her to see who was calling, he drank in the lovely lines of his wife's wistful face. What would he say? Nothing that might give him away, or she might try to stop him. While he was trying to decide on something suitably trivial, he glimpsed another face in the background of the screen, Bob Schilling, sitting beside Stephanie on the davenport!

"Wrong number," Doc said in a numb voice that needed no disguise, and broke the connection without her seeing him.

A moment before, Doc had conjured a husband for Stephanie during the twenty-year interval, out of insubstantial air, a lay figure with no features, no objections to stepping out of the picture when his purpose had been served. Now that figure had become alive, and vital, making the concept infinitely harder to take. But that was unreasonable, Doc told himself. He would not want Stephanie alone, with nobody to care for her, and what better candidate could he imagine than Bob Schilling? The attempt at a rational approach did not serve to lift Doc's



depression.

Woodenly, he reached for a small scratch pad and pencil that lay on his desk, and wrote,

Stephanie, my dear,

I have been thinking things over. It will be better for you not to be tied to a man so much older than you are. And as for me, it doesn't seem to matter any—

The pad was only about five inches by eight, and Doc's big scrawl had already filled a full page. He tore it off, to start on the second sheet, glancing at the clock to see how much time he had left. The jury rig was complete. When the minute hand of the clock touched twelve again, it would set in operation a relay to throw the switches and activate TIGER. It was ten minutes to ten. If Doc intended to write much more, he would have to disconnect his rig and reset it.

He glanced at the sheet he had already written. Hadn't he said all there was to say? He tucked the sheet into the corner of his desk blotter, and absently slipped the rest of the pad into the pocket of his white coat.

Blanking all else but the requisite motions from his mind, Doc squeezed into the chamber. If he had not been so short, a man with his waist measure couldn't have made it, for the bulky machine had a small heart. He had to twist, while sweat stood out on his forehead, to close the port and fasten the inner-seal clamps. With the quartz port closed, he could see the clock again;

four seconds to go.

Then he seemed to rise, higher and excruciatingly higher, on mounting waves of black nausea, while intolerably brilliant colored light smote his eyeballs through tightly closed lids, and a sort of whining thunder vibrated in his ears. He blacked out.

He felt terribly weak when he came to, but the Aurora Borealis effect had merely blurred his vision. His opening eyes saw the clock face again; it said ten-twelve.

He could not think clearly, yet, but this ten-twelve staring him in the face indicated something wrong. The relay had been set to turn off automatically after the power was on twelve minutes. Twelve minutes was then the lag, the actual duration of the trip for the passenger, while time outside the chamber theoretically proceeded ten years—or fifteen—or twenty. With the reaction not adjustable within a year or a decade, surely it was an improbable coincidence that an exact number of days, to the hour and minute, had elapsed outside. The Plant, the clock, might still be there fifteen or twenty years later, but the chances were one thousand three hundred ninety-nine to one against his arriving at ten-twelve p.m.

He could only conclude that he had not traveled in time at all, that the power had not been on long enough either to transport him or to kill him. Had Morrison's dirty gossip borne fruit, had the men on the night shift in the Plant been

ordered to block further experiment with TIGER?

That angry thought poured enough adrenalin into Doc's blood stream to give him the strength he would otherwise have lacked, to turn the clamps. The chamber had its own oxygen supply, ten times as much as would be needed for the longest lag Doc's calculations admitted, but the purifier removed nothing but CO₂, and the chamber was stiflingly hot. His jaw set and his eyes closed with the effort of forcing his weak muscles to turn the last clamp, Doc fell from the port, onto the concrete floor. It was deliciously cool there, and he lay too weak to rise.

Something soft and tickly lay over his arm. He opened his eyes to look at it. Hair! Long, white hair. He put a trembling hand to his chin. He felt a beard, ran his hand down it, lowered his eyes, looked at it. It reached to his waist and beyond, mingled with stringy white fringe growing from his head. And he had no protruding stomach! Twelve minutes before, he had been a fat man, and now his hands were skeletal claws, their backs covered with the dotted pigment of extreme age.

He inched his weak body, squirming with infinite slowness, toward a shining stainless-steel housing a few feet away. From the reflecting surface, Rip Van Winkle in person looked back at him. The shock further upset his already weakened faculties. He was desperately hun-

gry and thirsty. He needed food to give him strength to figure out what had happened. If only twelve minutes had passed in the world outside the chamber, the midnight lunch Stephanie always packed for him would still be in the bottom drawer of his desk.

His toothless old mouth drooling with anticipation, he inched himself painfully across the floor. Pitiful wreck that he was, death at the moment seemed infinitely less attractive than it had before he entered the chamber. He had a new problem to consider; for that, he must revive himself.

If the laboratory door had been closed, he could never have raised himself to open it; he would have lain there, to faint from hunger. But it was blessedly open, as he had left it. At long last, he crawled to the desk, and reached shakily into the bottom drawer, only then noticing that the white coat hung on him, rotten with age and sizes too large. He touched a partially full half-pint bottle of whisky. A trembling hand brought it to his mouth, and his toothless gums worried over the screw top. The bottle, emptied, dropped from a limp hand to the floor.

Then the liquor burned hot in his middle, giving him strength enough to sit up, leaning against the desk. Next he found the lunch box. The sandwiches were still fresh, the coffee in the chemo-bottle still hot, proof positive that only twelve minutes had passed in the outside world

while he aged twenty years.

As he wolfed the food, unchewed, for he had no chewing equipment left, he wrestled with the facts. Time travel would mean that time inside the chamber accelerated, that twelve minutes inside equaled twenty years outside. But actually, time within the chamber slowed down, and twenty years inside equalled twelve minutes outside. The third alternative he had not considered!

He was not Rip Van Winkle, for Rip had merely slept for twenty years; his sleep might have had no more subjective duration than any other sleep, but both Rip and the rest of the world had continued on normal schedule. Dr. George Arlich, on the other hand, was a man of eighty, who twelve minutes before had regretted his sixty years. Stephanie's husband, once old enough to be her father, was now old enough to be her great-grandfather, at least in a line tending to early marriage!

The experimental animals that had preceded him in the chamber were dead, all right, but not from some mysterious disintegration. Merely because their life span was shorter than that of a human being. But what had happened to their bones? Had the subsequent trials of the machine produced a cumulative effect, or had the inside time slowed down even more than it had in his own case, had their bones turned to dust, agitated into the atmosphere by the chamber's oxygen jet, that he could still hear hissing from

the loft?

Suddenly Doc remembered the tortoise. They had tried the machine once on a tortoise, and it had not disappeared like the mice and the dogs, apparently nothing whatever had happened to it. Of course, a tortoise could live many years longer than any other animal they had tried, and it could live for a long time without food, though it would not grow. But how had Doc himself survived the immensely stepped-up anabolism and catabolism of twenty years condensed into twelve minutes? There was not enough oxygen for a year of even the deepest sleep. The fat on him would not have sustained him for a minute of such metabolism, let alone twelve.

The more the food gave him strength to think, the more paradoxes presented themselves. For instance, his teeth. Had he swallowed them? But he was alive. The important thing was, he was alive, as he verified by pinching the withered skin on the back of his hand. So long as he was alive, he would arrive at the mathematics of it some day.

But how many "some days" were left to a man of eighty? He might die very soon. He must record the experiment at once, so that, if he died, they would know what TIGER had done. He managed to stand long enough to get to his desk chair, and sank into it, reaching for his wire recorder.

The skinny, trembling hand

ASTOUNDING SCIENCE-FICTION

paused on the recorder switch. Was recording the experiment really so vital? Years of scientific habit struggled with common sense. Surely, he thought, nobody would ever use TIGER again, if that was what it would do. What conceivable advantage was there in throwing away twenty years of life? Not even for penal purposes would such a thing be acceptable. But if— But if—

The skeletal hand clutched a slip stick a fat hand had held so often before, making quick calculations. Doc's mind now was as acute as it had ever been. If his original problem were involved, if TIGER had actually done what it was built to do, then reversing the process would be a matter of extreme complexity, requiring a chamber within a chamber. But since the space-time within the chamber was merely compressed, then reversing the process would mean little more than reversing the polarity.

At the thought of undergoing another ordeal in the chamber, the wasted body shuddered. He would die, Doc thought. He had lived on nothing before, like a tortoise. Could he stand it again, now that he was little more than a sack of skin and bones? But reversal might mean a more favorable situation, might mean the metabolism—he gave up trying to figure that one out, his knowledge of physiology was sketchy.

Still—what did he have to lose? What man of eighty would not gamble the few problematical years,

days, or hours, left to him, for the stakes of vigorous young manhood? Stephanie—if he set the relay for a longer period in the reversal, could he hope to emerge as young as Stephanie? The reaction was a wild variable.

"I'll do it!" he shouted aloud in the empty lab, and the cracked old voice startled him. He would have to be careful of that, when using the inter-com. He buzzed the Plant proper.

"Yeah, this is Sparky," the switchboard engineer answered. "You want me to switch the two leads on the circuit breaker to TIGER? O.K., it'll take about ten minutes. Want an electrician up there? No? All right, I'll call you right back."

Within the promised time, the buzzer in the laboratory sounded. "Polarity's reversed, power's back on," Sparky reported.

Pulling himself to his feet with the aid of the chair back, Doc staggered with bent knees toward the clock. His shoe soles flapped, the stitching rotted through, the nails rusted. The rotten white rags that hung loosely from him tore at every step. As he passed a rubbish chute, he tore the remnants of the clothing from his body and dropped them in. The chute led directly into an incinerator. He chuckled sardonically at this reminder of the days when the details of the TIGER experiments were so closely guarded

that his random notes could not be trusted to wastepaper baskets. If anyone had looked into the loft, at ten forty-five that night, he would have seen an incredibly old, incredibly skinny man, standing stark naked before the clock, re-setting the jury rig.

At eleven, the generator hum changed its pitch as it picked up the extra load. Sparky's practiced eye glanced down the long switchboard, to the ammeters on the TIGER panel.

About fifteen minutes later, Ted Smith, the night Plant foreman, came by on his rounds. The switchboard engineer stopped him.

"Doc Arlich is takin' some stitches in time, tonight," Sparky said. "Must of set his resistor bank way down low. I hope he knows what he's doin'."

"What makes you think he don't?" the foreman asked.

"Oh, you know these theory sharks. Can't tie an underwriter's knot. He had me reverse the polarity on the TIGER circuit. I don't know what he done up there. I asked him if he wanted any help, and he said no, he'd handle what little he wanted done himself. What worries me, his voice sounded funny, on the inter-com. Shaky, like."

"Well, he's all alone, up there. We can't stand here, and let him get fried! Did he sound drunk, or what?"

"There's a rumor goin' around

that the old boy hasn't got all his marbles. I go with one of the girls that works in the office, and she told me."

That was enough for Smitty. "He's got no business foolin' with 2300 then! You stand by that circuit breaker, while I try to get him on the inter-com, and see if he's all right."

Smitty, the foreman, stepped over to the inter-com and pushed the button to the laboratory.

"Dr. Arlich!" he called into the mouthpiece. His voice, already pitched to carry over the noise of the Plant, mounted higher in excitement. "Dr. Arlich, are you O.K.? Do you need any help?"

Still getting no answer, he gestured to Sparky. "Listen, Dr. Arlich," he said, "we don't want to mess up your experiment or nothing, but if you don't answer in three seconds, we're going to trip the breaker!"

In three seconds, Smitty's up-raised hand dropped, and Sparky tripped the breaker. It was then twenty minutes after eleven. Smitty started for the elevator.

At midnight, a hushed and serious group stood around in the TIGER loft. Every light in the loft and laboratory was blazing, for the benefit of two Secret Service men who were going over the place inch by inch, taking photographs. The machine was again, lifeless, its quartz port agape.

Riggs, Secret Service Bureau

chief, was nominally in charge on Federal property, but he was letting others do the talking, at the moment. Bob Schilling, having been summoned just after he returned to his apartment, while he was undressing for bed, was not his usual immaculate self; he had arrived without a tie or a shave. The county sheriff was talking with the foreman and the engineer. To one side stood a uniformed county policeman, awkwardly holding a squalling infant apparently about six months old, wrapped in a man-sized white coverall.

Fred Morrison, though his name was not on the list of those to be admitted at the main entrance, was blessed with a genius for smelling excitement, and arrived at the loft soon after the floodlights went on outside the Plant. He was holding forth at the moment.

"I told you, Bob, Doc was going crazy, I told you he was thinking about experimenting with babies, but you said I had no basis for interpreting his remarks that way. Now, maybe you'll swallow those words!"

"The child hasn't been hurt," Schilling pointed out.

"Maybe the kid is all right, but Doc kidnaped it, it was found in the machine. Anyway you look at it, there's going to be a stink, and you could have prevented it—"

"Shut up, Fred," Bob Schilling said, in an undertone, "Doc may be dead. Can't you show a little respect for him, now? If he committed

suicide, certain people around here who talk too much, contributed toward it. Why are you here, anyway? There's nothing you can do to help."

"I could take the kid's fingerprints," Morrison pointed out righteously. "What's that fellow's name?"

"Riggs," Schilling said.

Morrison went over to him. "Mr. Riggs," he said, "I'm the Identification man here in the Plant. I could attempt to identify the child, if it will be of any assistance. I have all the equipment in my office, just down the hall."

Riggs looked him over carefully. "All right," he said finally. "Just one set of prints, please, and we will take care of the identification."

"That may not be so easy, I have a feeling that this child was *not* born in a hospital," Morrison said as he left to get his equipment.

Schilling breathed in relief. "Thank goodness, we got *him* out of here, before Mrs. Arlich showed up," he said to Riggs.

"That the one the suicide note is wrote to?" The sheriff inquired. Schilling nodded.

But Morrison was back on the double. Efficiently, if not gently, he smeared the tiny fingers on the ink pad, while the infant screamed louder than ever.

"Why do I get the job of holding this kid?" the county policeman complained.

Riggs took charge of the prints, waved them in the air to dry, and



motioned to one of the photographers. "V. P. them in, and bring them right back," he said.

As the man left on his assignment, he almost collided at the door with Stephanie, who was escorted by two more Secret Service men. She had on the same clothes she had been wearing when Bob Schilling left the Arlich home, shortly before eleven, but her long hair was streaming darkly over her shoulders. Bob had never seen it that way, he thought it was very beautiful, contrasting with the pallor of her wistfully hollowed cheeks.

"Have you . . . found him?" she asked of the assembled company in general.

Bob Schilling wasn't the only man in the room whose eyesight was in good condition. The sheriff fancied himself quite a lady's man, and he was not averse to giving this unexpectedly lovely vision the impression that he was running the show.

"Not yet, ma'am," the sheriff said, "but don't give up hope. We may not find him till daylight. We got plenty of men looking, though, and maybe they will spot the white coat. He left his street clothes here, his helio-car, too, so he prob'ly didn't go far. This seems to be for you, ma'am," he added, indicating the note on the desk. "You can read it, but don't touch it, please."

As she walked across the laboratory, and to the desk, her foot touched the whisky bottle on the floor, and she paused.

"That's all right, Mrs. Arlich," Riggs said. "We've already photographed the whole laboratory, we're starting on the loft, next." He picked up the bottle and put it on the desk.

Stephanie bent over the note. When she raised her head, there were no tears, but her eyes were blazing.

"You stupid males," she burst out. "Can't you tell that poor baby is scared half to death, and cold, and hungry? How dare you keep him here in this drafty place? Here, give him to me," she commanded, striding over to the policeman who had been pressed into nursemaid duty.

"What a woman!" Bob Schilling said proudly, in an aside to Riggs.

The policeman relinquished his charge gladly. "How did you know it was a him?" he inquired.

"Oh, I don't know. I just knew," Stephanie said, and then went off into a string of nonsense syllables that nobody but the baby understood, as she cuddled him. With breathless gasps, the baby's crying subsided, and his head dropped, in sheer exhaustion, on Stephanie's shoulder.

"We were going to take him to a hospital, in just a minute," the policeman apologized.

"You'll take him to no hospital tonight!" Stephanie declared. "I work at one, you understand. I know how the staffs are overloaded. This child needs somebody to love him to pieces, or he'll be scared and have nightmares for the next six months.

There isn't time for love in a hospital. Get me another coat, somebody, this one is wet. No, I've got a better idea. There's a cotton blanket on the couch in the women's rest room—or there used to be, when I worked here."

Getting a nod from the sheriff for permission, the policeman trotted off obediently on the errand.

"You think you could let her?" Schilling asked Riggs. "You have to admit, she's obviously qualified for the job."

"Well, I don't know," Riggs said. "It's highly irregular. But on the other hand, we have to keep her under what amounts to house arrest anyway, her husband may have told her some pertinent facts."

"It would give her something to do, take her mind off this thing," Schilling urged.

The Federal man who had gone to check on the baby's identification came back, and handed the prints to his chief. "They ran all the cards filed in the past nine months through the sorter. Neither the District Identification Bureau nor Washington has this child on file," he reported briefly.

"I told you so," Morrison put in smugly.

"Well, sheriff," Riggs said, "I guess that means it's your job to find the baby's mama, she's not likely to turn up on Federal property." Noting the fingerprint cards were still damp enough to smear, he put them on the laboratory desk to dry.

"Yeah," the sheriff growled, "we get all the leg work."

The county policeman brought back a cotton blanket, printed in an Indian design. Stephanie proceeded to the intricate task of unwrapping the white coat, and replacing it with the blanket, without exposing enough of the baby's epidermis to the chill air to start him crying again. She had quite an audience; everybody in the room, in fact, except the two photographers, who were reloading their cameras. She had caught on quickly enough whom she had to convince, and she was explaining to Riggs:

"I have everything at home, bottles, diapers, clothes; I was hoping to have a baby myself, about a year ago, but it didn't work out that way. And I've mixed hundreds of formulas in the hospital. He should be old enough to take his milk straight, but it won't do any harm to baby him for a while. Of course, I'll have a pediatrician check him as soon as I get him home, but he doesn't have a fever."

She seemed to have the situation well in hand, and Bob Schilling sat down in Doc's desk chair, to relax for a moment. It looked as if he might be up the rest of the night, and he was already tired. The whisky bottle and the baby's fingerprint cards lay side by side before him. The angle of light from the desk lamp, made a very clear right thumb print on the bottle visible. Stephanie had her back toward him; over the

crook of her arm, he could see the top of the baby's head. The baby had only a thin, downy blond fuzz for hair, and something about the skull structure, with a slightly flattened place on top the cranium, struck Bob as reminiscent of another bald head he had seen a thousand times.

A wild hunch hit him. A Phoenix risen from the ashes of TIGER's failure? No, he could not believe it! This hunch was just too crazy to mention to anybody, yet he could not rest until he disproved it to his own satisfaction. With elaborate casualness, he glanced down at the desk again. The two right thumb prints—Doc's and the baby's—would not, simply could not, match. *But they did.* The light was good—Bob Schilling's eyes weren't playing him tricks. At the terrible, wonderful truth, he almost fell backwards in the tilting swivel chair.

But how had Doc done it? The reversed polarity had something to do with it. Was the double run of the machine the switchboard engineer reported, also an essential to the process? Suppose Doc's experiment couldn't be repeated successfully?

If that should be the case, nobody must know it! It would be too cruel to dangle something so precious as life itself before people's eyes, excite the country to hysterical rejoicing, and then tell them they couldn't have it. That kind of grief, Bob Schilling decided, he couldn't inflict on anybody, he would have to bear it all himself.

And how would this thing affect Stephanie? The prospects of how the newspapers would sensationalize it, were pretty terrible to contemplate. If Doc had merely turned into a young man, it would make a pretty story—but *this!*

One part of Bob Schilling was moved by a nearly irresistible curiosity, to examine the baby more carefully; another part of him felt revolted. A moment before, the child had looked to him like a perfectly ordinary infant, in no marked respect different from thousands of others. Now, he would never be able to look at it again, without thinking what it would have been, if the Plant foreman had not tripped the circuit breaker before the relay was completed. Holding himself in taut control, Schilling rejoined the group around Stephanie.

"You understand, Mrs. Arlich," Riggs was telling her, "that we are responsible for this child until the parents are located. If the mother is not found within a reasonable length of time, the Court will probably place the child in an institution. In any event, if it should become ill—"

"He," Stephanie corrected. "Not it. You speak as if he weren't a person!"

"If *he* should become ill," Riggs continued, "he must be sent to an accredited hospital. One or more of my men will be on call at all times at your house to take him there, then we are in the clear if he should die."

"How you talk!" Stephanie said.

"He's a perfectly normal, healthy baby, as fine a specimen as I've ever seen. He's not going to die! Not unless he starves to death before you let me take him home!"

Riggs smiled. "All right," he said. "Take him home and feed him."

Now the tears Stephanie had held back came to her eyes. "Oh, thank you," she said, "thank you, even if I can keep him only a little while—"

As she started to leave, with her guard flanking her on either side, she paused to speak to Bob Schilling. "I appreciate your trying to help, Bob," she said. "Good-by for now, and let me know if . . . if . . . they find out anything."

"I will," Schilling promised.

Morrison interposed himself between them. "Don't you speak to your old friends any more?" he demanded.

Stephanie stared coldly at him, and held the baby closer, as if to protect him. "Yes," she said distinctly, "I do. To my friends." And she was gone, with a definite flounce of her skirts.

"Well, how do you like that?" Morrison said after she was out the door. "Strikes me, there's a handy little helpmate for a kidnaper. Quite expert at taking care of the nursery department."

Schilling turned on the other man with clenched fists. "Look, Fred," he demanded, "how do we know *you* didn't put the kid in the machine?"

The sheriff stepped closer, interested in this new and promising development. Riggs unobtrusively

turned on the recorder on Doc's desk. Smitty and Sparky settled on their heels in a corner, to wait till somebody called for them.

"Why, boss—" Morrison stammered. It was curious that he should use the term. Nobody in the Plant called Bob Schilling "boss," not even behind his back.

"It's mighty suspicious how you showed up when nobody V. P'd you," Schilling went on. "You were the one started this rumor about experimenting with babies—you just admitted it. We have nothing but your say-so that Doc even hinted at the idea. You were the one who drew a diagram about how certain babies might not have their identity and whereabouts recorded. And how did you get in here, by the way? Not through the main entrance—you're not on the list."

"I can explain that," Morrison said.

"When I'm finished, you can explain several things. A couple of years ago, some unauthorized person put a white mouse in the chamber, with the deliberate intention of conveying the impression that one of the mice Doc attempted to send into the future, had reappeared. Somebody gave out an unauthorized news story before Doc issued his official report. After headlines about a time-traveling mouse, Doc's denial that it was the same mouse, made him look like a fool, or a charlatan. I have never been entirely convinced that was the thoughtless prank of a watchman. It looked to

me more like the fine hand of a professional trouble-maker. It certainly had an effect on the decision of Congress to cut Doc's funds."

"You're making a lot of unprovable charges," Morrison said.

"Why were you always spreading malicious gossip about Doc? Why did you have it in for him? Could it be because he married a certain eighteen-year-old girl who used to work in your office? Did you ever make advances to that girl, either before or after she became Doc's wife?"

Morrison had recovered his nimble wits, and struck back. "As you said yourself, this morning, Schilling, who wouldn't?"

Bob Schilling's mouth tightened. "To refresh your memory, what I said was, 'Who couldn't.' I also added, 'Who would?' Your answer is immaterial, anyway. She'll testify, if necessary."

"What has that got to do with the baby in the machine?" Morrison demanded.

"Plenty. The baby is a swell smoke screen. It's presence will turn public sentiment against Doc, cast doubts on his sanity. Doc read several papers before scientific societies, explaining that the survival of an experimental animal would depend upon whether somebody was handy, ten or twenty years in the future, to open the port before the oxygen supply gave out. A baby would be as helpless as an animal to open the port himself. If those men are led

to believe that Doc tried to use a baby, they will be convinced, as you put it, that he was 'off his rocker.' People will be ready to concede that a man unbalanced enough to entertain such an idea, would also commit suicide, probably to escape the consequences of taking the child."

Bob Schilling paused significantly. Then he snapped, "Where did you put Doc's body, Morrison? Into the machine?"

With ample warning the accusation was coming, Morrison betrayed no emotion. "Are you prepared to prove, Schilling, that I and not Doc wrote the suicide note?" he inquired coolly.

"It looks like his handwriting, all right," Schilling conceded, "but is it a suicide note? It could be interpreted several ways. Perhaps, when you saw Doc had written an ambiguous note like that, you decided this was your chance to kill him. Did the note itself give you the nerve to do it, make you think you could get away with murder?"

"I didn't kill Arlich," Morrison declared, "and I don't believe he intended to commit suicide, either. I believe he intended to send himself into the future. And of course, he actually did commit suicide in the attempt; he disintegrated himself. That's the meaning of the trigger mechanism he put on the clock."

"I see," Schilling said, "provided we believe that Doc, and not you, rigged up the trigger mechanism. You're rather clever with tools yourself, aren't you? But some peo-

ple might not agree with your contention that TIGER has proved a failure. Some people still believe the animals went into the future. If Doc showed his own confidence, by entering the chamber himself, it would re-enforce popular belief in the machine, wouldn't it? Government support might even be renewed. Doc would be something of a popular hero. His wife wouldn't believe he was dead, she would be proud of him, and happy to wait for him. You didn't want that, did you? So you left the baby in the machine, to make it look as if Doc were a madman, throwing himself into a machine he knew would destroy him, instead of a confident scientist, using himself as a guinea pig."

"This is where I came in," Morrison said. "Now you're back where you started, with your wild accusation that I kidnaped the baby and put him in the machine."

"Who else could have done it?" Schilling demanded. "Doc couldn't, if your assertion that he put himself into the machine is correct. He couldn't have done it, if you put him into the machine, either."

He turned to the switchboard engineer. "What time did the first power drag go on, Sparky?"

"Around ten o'clock," Sparky answered promptly. "It lasted about twelve minutes. Then, a little after ten-thirty, he called me and told me to reverse the polarity."

"Are you positive that was Dr. Arlich's voice?"

"Well, he said he was Arlich. But

come to think of it, I couldn't be sure it was. Like I said, his voice sounded awful funny, not like it usually sounded."

"How did he react when you offered to send an electrician to help him?"

"Well, he acted kind of sore. He said, 'I'm quite capable of doing what little I need done here myself, thank you.' Like he didn't want anybody snooping around in his business. So I just done what he told me."

"What time did the second drag go on?"

"Around eleven. He was pulling more juice that time; he had his resistor wide open."

"What time was it you called Dr. Arlich back, and failed to get an answer, Smitty?"

"Oh, I'd say about a quarter after. I didn't look at the time, then. But I did notice, it was eleven-twenty when I give Sparky the high-sign to trip the breaker. Then I come up here as quick as I could, and found the automatics set to turn her off at eleven twenty-five."

"And you figure the baby must have been put in the chamber in the few minutes between the time you tripped the breaker, and the time you got up here?"

"He must of been. He sure wasn't in there when the power was on, or he wouldn't of been there, if you know what I mean. Either he would of been in the future, or he would of been—*poof*—take your choice, but he

wouldn't of been in the Sewing Machine here and now."

"Did you immediately search the premises to see if somebody had run out the other door as you came in?"

"No! I was too excited. I like to of passed out, seein' a little naked kid in there, when I looked into that there port. I got kids of my own, for a minute it was like if *my* kid was in there. All I could think of was grabbing him out. I wrapped the first thing I could lay hands on around him, and V. P'd you. Him squallin' bloody murder and me tryin' to dial with the other hand and hear what you was sayin'. Lucky I got you that time, I V. P'd you before, at eleven, about some reports I was fillin' out, but you weren't home."

"Then you didn't search at all until after you talked with me?"

"No, sir. You told me to turn on all the hall lights and the floodlights outside, alert the watchmen, and take as many men as I could spare off the shift to help look around for Dr. Arlich and anybody that wasn't supposed to be in the place this time of night. You told me to take over till the police got here."

"Then, at least five minutes elapsed between the time you found the baby, and the time you started searching?"

"Prob'ly more than that," Smitty said.

"Did you search the private offices?" Schilling asked.

"No, sir. You know there is classified stuff in there sometimes, and

they are kept locked. Regulations are that nobody is supposed to go in there at night but the head cleaning woman, and she only works a four-hour shift, from five to nine. Only way they could be opened, after she goes home with her keys, is if there was a fire; then the automatic alarm system unlocks all the doors in the building."

"Or if one of the executives came back at night?"

"Well, sure, each guy has got a key to his own office," Smitty conceded.

"I know what you're leading up to," Morrison broke in, "and it's a lie. I didn't hide in my office, or impersonate Doc. I came into this building soon after you did. I live up on the hill, I saw the floodlights go on, and I came down to see what it was all about. Now I wish I'd stayed home. But as long as I'm here, I'd like to ask a few questions myself. This man says he V. P.'d you at eleven, and you weren't home. I can play detective too, Schilling. Where were you at eleven o'clock tonight?"

"On my way between Dr. Arlich's home and my own," Bob replied evenly.

A nasty grin twisted Morrison's face. "So our little Eagle Scout was with Stephanie?" he inquired significantly.

"Yes, I was with Stephanie for several hours," Bob admitted straightforwardly.

"And what, may I ask, were you doing there while her husband was

not at home?"

Bob Schilling's control broke. "You may ask," he roared, "and I am going to tell you. I deliberately went there when Doc wasn't home, to tell her about the malicious gossip you were spreading. I didn't want Doc to know about it, if I could help it; he'd been hurt enough. I told her you weren't satisfied with the harm you'd done with that mouse trick, that you were apparently disgruntled because she was still sticking to him, two years after you pulled the props out from under his work. I asked her to stop merely avoiding you, to make an excuse to see you, and try to talk some decency into you, before you ruined Doc entirely or drove him to suicide."

"If you thought I needed telling off, why didn't you do the job yourself? You could always get Civil Service to reassign me."

"That's just the point. If you became *persona non grata* around here, you could always get your old job back, with the Identification headquarters in Washington. Then you'd be in a beautiful spot to gossip on a grander scale. How long would it be before you had another Senate Committee on Doc's neck? A few groundless charges would subject him to trial by newspaper.

"Or I could tell you off and keep you here. But I'm only a human being, Fred. If I ever got you in my office, and brought all your past poison out in open discussion, the logical computation would call for a sock in the teeth, no other argument

seems to have any effect on you. Then you'd go around showing off a black eye, and telling everybody I was running the Plant by Gestapo methods. They'd be calling me 'the butcher' before you got through. I know your technique, Fred. Gossip is a thing no man can lick in an open, honest fight."

"So you're staging a dishonest fight," Morrison sneered. "Instead of charging me with gossip, you're trying to pin a little matter of murder and kidnaping on me."

Riggs, the Secret Service chief, interposed a remark. "You're doing a good job, Schilling," he said, "better than any of us could do, because you know the background better. And this is the time to do it, before it gets cold. But you seem to be a little off the point, now. How about summing up your theory of the case?"

Bob Schilling wiped his neck and forehead with his handkerchief. This was taking more out of him than a fist fight. "O.K.," he agreed.

"Now, Fred," he began, "I'm not a policeman, and you don't have to answer unless you want to."

"Oh, yes you are," the sheriff put in, "I hereby deputize you."

"Well, anyway," Schilling went on, "whether I am or not, you don't have to admit anything that would incriminate you. But when I am through, maybe you will see that the thing is obvious enough so that you might as well confess."

"You have some means of getting

into this building at night without signing in at the front door—I've been aware of that for some time. It wouldn't be hard to arrange, with all the master keys to the various entrances kept in the safe in the Identification office—yours.

"This morning—I guess it was this morning, though it seems a long time ago—you laid the groundwork. You implanted in the minds of several people the idea that Dr. Arlich was going insane, that he intended to experiment with a baby whose identity and whereabouts was not recorded.

"Maybe you already had such a baby, when you made your speech in the cafeteria. At any rate, you got hold of one, intending to use it to discredit Doc completely. You lost no time in taking the fingerprints, just now, which suggests to me that you knew they were not recorded.

"You couldn't leave that baby in the machine in the daytime; the way you left the mouse. Doc wouldn't be here to stop you, but too many people might see you bring the child into the Plant. You can carry a mouse in your pocket, not a baby. The simplest way to get Doc to let you leave the baby here, would be drugged whisky; then drunkenness would be added to Doc's other demerits when the baby was found.

"Doc would tell, of course, when he came to, that you had brought the child, but you were willing, at least to begin with, to take that chance. Being a fingerprint man,

you would think of arranging things so that none of your fingerprints were on the whisky bottle or anything else around here. You intended to pass Doc's charge off as the rantings of a deranged man, trying to squirm out of a mess, using a long-standing enemy as a scapegoat.

"I don't know just how you explained it to Doc; it doesn't matter much. Probably you told him you actually believed he wanted such a baby to experiment with, and had brought it, having confidence TIGER would send it into the future. Of course, Doc laughed at any such notion. You suggested a drink, and no hard feelings. Perhaps he accepted, if not, you are strong enough to have forced it down him. I know Doc was a meticulous, tidy man, not in the habit of dropping whisky bottles on the floor.

"With Doc unconscious, you had a better chance to look around. You read this note he had been writing. I believe that he intended to offer Stephanie a divorce. I am certain there were more pages to the note—this page ends in the middle of a sentence. The other pages had something more specific on them, so you disposed of them, together with the remains of the pad, which would show by pencil impressions what had been written. Now you had a pretty good suicide note, in Doc's own handwriting.

"You had a simple motive for murder, Fred. One of the simplest, and the oldest. You also had an advantage most criminals don't en-

joy; a perfect means of disposing of the body; TIGER. No corpse. No drugs found in the stomach. For your purposes, it didn't matter much whether the machine would disintegrate him, as you believed, or whether it would send him into the future. That 'suicide note' was the final touch you needed to give you the nerve to do what you had wanted to do for a long time. Murdering him would be a more certain method of breaking him and Stephanie up than merely disgracing him, and then you wouldn't have to take a chance on what he would say about you when he came to.

"There is another strong possibility; maybe by that time, you discovered that he wasn't *going* to come to. Drugged whisky alone could have killed him. As you have often pointed out yourself, he was not a well man. That would mean you were in too deep to save yourself by any means but using the machine.

"You rigged up the clock mechanism, to make it look as if he had done it himself, probably dragging him over, to be sure there were plenty of his fingerprints on the clock, and of course, none of yours. Then you put Doc, either dead or unconscious, into the chamber. At ten, the trigger tripped, and the power was on twelve minutes.

"With Doc gone, you began thinking that you had added to his glory, when your original purpose was to detract from it. The baby still had to be planted, and discovered. You wanted it discovered very



soon; if it was not found until the day shift came on, suspicion would point less clearly at Doc, there would be more people around who might have framed him, or played a ghastly joke. The next day, for that matter, you would be known to be in the office yourself, and if you stayed away, it would look even worse.

"So you had to create doubt in the Plant, as to the rationality of Doc's actions. You gave them the silliest order you could think of, to reverse the polarity, and refused to let anyone come up here. You set the resistor so low that they would worry about the circuit being overloaded, and melting down the breaker. You set the relay for a much longer period than the machine was usually

operated. When the power went off, you put the child in the chamber, ducked out the other door, and locked yourself in your private office, until there was enough confusion here so you could appear.

"The only trouble with your method of covering up your crimes, was that you were too thorough. You planted too many clues. If Doc had time-tripped himself at eleven o'clock, he wouldn't have been here at eleven-twenty to place the baby in the machine. On the other hand, if he made a couple of trial runs of the machine, preparatory to sending the baby, if he had become panicky, when the power went off, and departed precipitously for fear of discovery, there would have been no suicide note, surely no trigger



mechanism on the clock. Well, Morrison, have I left out any details?"

"Are you quite through?" Morrison inquired acidly.

"For now at least," Schilling said.

"Then I say it is the most preposterous accusation I have ever heard, and I intend to sue you for slander. Suppose Doc made a couple of trial runs, to test the trigger and reversal, intending to send the baby on the third run, and himself on the fourth? You don't even know yet that Doc isn't alive; maybe he hopped a ship to Luna. I'm going to my files, get Arlich's prints, and show you that their facsimiles on the clock are in such a position that he could have made them only while

alive and conscious. I'll take the baby's prints, too. If the child is not recorded, all available information should be sent to the District Identification branch immediately; that's the law."

"Oh, no you don't," Schilling said hastily, blocking Morrison's access to the desk. "You think I'm going to let you go to your office and tamper with any evidence that may be there, such as a missing key?"

"You had no objections to my going in there before," Morrison pointed out.

"That was before you knew anybody suspected you."

Riggs, of Secret Service, stepped forward. "We're holding you for further questioning, Morrison," he said, picking up the baby's finger-

print cards and putting them in his pocket. "That will relieve you of any responsibility you may feel about these prints."

The county policeman who had previously served as nursemaid, looked expectant. "Thanks," Riggs said to him. "Tell the turnkey one of my men will be over in about fifteen minutes."

"O.K., buddy, let's go," the policeman said. "Rather take care of you than a baby, anyway. You're house-broke, I hope."

Morrison turned savagely on Schilling just before they left. "It's true that I carry a duplicate key to the West entrance," he said, "but outside of that, you can't prove a thing."

Schilling watched the two men go down the hall. "I'm afraid he's right," he said to Riggs, "but I accomplished what I wanted to, anyway."

Riggs raised his eyebrows. "What was that?" he asked.

"For one thing, I didn't want him around the Plant tomorrow, or today, that is, spreading his version of this."

"You only had to tell me," Riggs said.

"Well, it won't do him any harm to sweat a little. Maybe it will teach him something. Look, I have a couple of other things to tell you—alone. Could we go to the Identification office and dig up Doc's prints?"

"Why not?" Riggs said. "Is the V. P. there plugged in at night? I

have to make a few calls."

"At least one of the sets in there is plugged in. I think you have a surprise coming."

"I'm surprised already," Riggs said enigmatically. He motioned to one of the photographers. "Hold the fort here," he said. "Nobody comes in. That means, nobody."

"Right, chief," the photographer said.

"Does that mean we can go back to our jobs now, Mr. Schilling?" the night Plant foreman asked. "I get worried, being away so long."

"Forgive me for forgetting about you, Smitty!" Schilling said. "Do you need them any more, Riggs?"

"Not right now," Riggs said, "so long as they don't leave the Plant."

"We can't leave before six a.m. anyway," Smitty said.

"We'll give you both an escort home at six," Riggs said. "And if any reporters stop you on the way, you can't talk English."

"Suits me," Smitty said. "I've done enough talkin' already, anyway. I'm not a talkin' man." And he and Sparky were off to the elevator at a jog trot.

The sheriff followed Riggs and Schilling into the hall. "Speaking of reporters," he said, "I can't figure out how come none of them are in here."

"The young army we've got patrolling the fence may have something to do with it," Riggs said.

"Well, there'll be plenty of them in my office. I've got to get back there," the sheriff said, consulting

his watch. "What can I tell them? Don't forget, I'm in an elective office."

"Can you hold them off for another hour, until I get a clearance?" Riggs asked.

"Well, maybe," the sheriff said. "As long as they get it for the morning finals. It won't be easy, though. I wish this had happened in city limits, instead of county territory."

Riggs laughed. "Uncle doesn't build his atomic plants in city limits. But I'll do my best to release enough to make a good story. Only not *too* good, you understand."

"All right, then," the sheriff said, as Riggs and Schilling went into the Identification office. "I'll meet you at the scene of the crime in an hour."

As a matter of fact, he was back sooner than that, cooling his heels outside the TIGER loft, indignant because the Federal man on duty wouldn't let him go inside and sit down, before Riggs returned.

Schilling emerged from the Identification room before Riggs did, and tried to calm the sheriff with the assurance that Riggs would be along, as soon as he made a few more calls. Tempers were none too smooth. Nobody had had any sleep, and a forecast of dawn was showing in the East.

"Oh, there you are," the sheriff said, when Riggs finally showed up. "It's just about last call for the morning finals. They will have to hide if they don't get something.

What's the good word from upstairs?"

"Find anything?" Riggs asked.

The sheriff shook his head. "No body. No frantic parents. At least none with a kid the right age and sex."

"You don't say!" Riggs exclaimed, with exaggerated surprise. "Well, here's what Uncle says we can release. The facts substantially as you personally know them."

"What do you mean by that?" the sheriff said, as the photographer relinquished his post to his superior, letting the three men go into the laboratory.

"Well, the sheriff's office has a couple of missing persons cases. Whereabouts of Dr. Arlich, inventor of the famous but recently inactive TIGER, unknown. Search going on. Our brave boys from the sheriff's office, and all that. You can run a photo of him, in case he should be suffering from amnesia, and somebody should spot him. Then a separate story, stating that a nude male infant, about six months old, was abandoned last night. Place where he was abandoned, unspecified. Present whereabouts, unspecified, unless you find somebody you think has a legitimate claim. We haven't got enough men at Mrs. Arlich's house to handle a crowd of curiosity seekers. Infant unregistered. Parents sought. You can run a photo of the baby, if Mrs. Arlich will let you shoot off flash bulbs in his face, but we'll have to take him to your office for that. Her phone is

shut off, by the way."

"What other pictures?" the sheriff asked.

"Outside of the Plant, in connection with Dr. Arlich's disappearance, if you want it. Nothing inside. No pictures of TIGER, not even an artist's conception, or somebody else will have your hide. Particularly no blueprints. All blueprints have been removed from the files here, as a security measure. Dr. Arlich's fingerprint cards here, in Washington, and all branch Identification bureaus, have also been classified."

"How are we supposed to identify a body then?" the sheriff asked, in surprise.

"Call my office, we'll send out a man, if you find anything. Or you can call Dr. Arlich's dentist."

"Well, now, let's see, the facts as I know them," the sheriff began, enumerating on his fingers. "The kid was found in the machine; the machine was operated twice last night, but the kid wasn't hurt—"

"What machine?" Riggs asked innocently.

"Why—THAT!" the sheriff said, pointing to the looming bulk of the Temporal Reactor.

"Did you see the child removed from the machine?" Riggs asked. "Were you here when the machine was in operation?"

"Of course not, but the foreman said—"

"Was he under oath?"

"No, I guess not," the sheriff agreed, seeing a nice batch of pub-

licity dwindling.

"You don't even know of your own knowledge that the child was found in the Plant, all you know is that it was in the building when you got here, and even that doesn't need to be mentioned to find the parents. I'm afraid you didn't quite understand me. I said this was two *separate* stories. There isn't necessarily any connection between them, now is there, except that both broke the same night, as a hundred other cases did."

"Look," the sheriff said, "you Feds can't hush this thing up that tight. Morrison will talk."

"Oh, yes, that reminds me. Morrison won't be enjoying your hospitality at the county jail much longer, sheriff. We have suddenly discovered that Uncle is in serious need of an Identification man at Glukamuk; the plane leaves in half an hour. He can talk all he likes at Glukamuk."

"Where's Glukamuk?" Schilling asked.

"An Eskimo village with fifty people and ten dog sleds. Nobody understands English, except the local missionary, who, incidentally is a crackajack at straightening out mental quirks, and will help Morrison while away his time. My men report that Morrison had no trouble seeing things our way. It has occurred to him, that there are practically no jobs for a man with his talents, except in government service, and he wouldn't want to be a bad security risk."

"You aren't preferring any charges against him?" the sheriff asked incredulously.

"Well, we find he didn't report his full income for 1969. But maybe the file might get lost. What about your man, who took Morrison into custody, and sat in on the entertainment, sheriff?"

"Nobody releases any stories from my office but me," the sheriff said, "but you sanctimonious characters wouldn't be protecting Morrison for some kind of a deal, would you? It looks to me like a clear case of murder. Schilling here built up an air-tight case against him, all you need is a confession. He can't draw a diagram of your precious machine, can he? I can't for the life of me see how any security questions are involved."

"I'm very happy to hear you say that, sheriff," Riggs said blandly, "but believe me, we are protecting nothing but the best interests of the country. Of course, if you should find Arlich's body, out in a field some place, that would bring the case within county jurisdiction, and furnish some concrete evidence. Then we would co-operate with you to the limit."

"And you know we won't find any body. I think you know a lot more than you're telling me, Riggs."

"That's what Uncle pays us for," Riggs agreed.

Schilling nudged Riggs, pointed to the desk.

"Oh, yes," Riggs said, picking up

the note Doc had written, and putting it into his pocket, along with the used spool from the wire recorder.

"This little piece of paper," he explained to the sheriff, "like everything else in the Plant, is, of course, Federal property. Uncle uses an awful lot of paper, one way or another. I think he needs this piece, for the paper drive. You didn't see it, did you, sheriff, any more than you examined the details of that odd-looking machine over there?"

"There is something funny going on here," the sheriff said, "but I'm not sticking my neck out. You can trust me, Riggs."

Another Federal man appeared in the doorway, and Riggs told him, "O.K., Bill, take over, so these boys can develop their pictures. Perron and Wylie will be here, in a few minutes, to do a little clean-up job. Outside of them, nobody comes in, not even Mr. Schilling, the Plant superintendent, here. Nothing goes out. Pass it on to the next watch."

"Right, chief. Likely to be any mice or anything show up in there? What should I do then?"

"I wouldn't worry about that, if I were you, Bill. You just keep out the rats."

"Right."

Riggs turned to the other two. "And now what do you say, gentlemen, that we all go out and get something to eat? This night work gets me down."

"Not me," the sheriff said. "If I don't get back within the next ten

minutes, I might as well leave my name off the ballot. They have been hounding my office ever since the floodlights went on, and they saw my car land here. They think at least something went wrong in the Plant, that the whole countryside is going to be radioactive, or something. They are going to be awful disappointed, when they find out we were just looking for an absent-minded professor who wandered off the reservation."

"You'll do, sheriff," Riggs said, laughing. "Be seein' you," he added, as the sheriff left.

As they started down the hall, Schilling declared, "I'll consider it an honor, Riggs, if you will permit me to buy you a large steak for breakfast. I have never seen a man move so fast, though I must admit it was something like a sleight-of-hand trick; you were moving so fast I couldn't see what you were doing."

"I say, Bill," Riggs called back to the man on guard at the TIGER loft, "you're a native here; where do you get the best steak in town at this hour?"

"Randolph's Steak House," the man replied promptly.

"That's at Fifty-second and Weston Boulevard—other side of town," Schilling said. "Suits me if it suits you."

"Done," Riggs agreed. "Mind going in my car? I have to be on call, you know."

As they passed through the corridors, Schilling was somewhat star-

tled to see that the Plant's force of janitors had apparently been multiplied vastly. The white coveralls with the Plant insignia were familiar, the faces above them were not. The men were washing down the interior walls, with a neatness and dispatch that suggested they had done nothing but wash down walls all their lives. There were enough of them to give the whole place a going-over before the morning whistle blew.

The gentle, elderly civilian who customarily presided over the main entrance at night, looked rather ineffectual, between two strapping young soldiers, complete with fixed bayonets, trench helmets, gas masks, hand grenades, and portable Geigers.

"Is there a war on?" Schilling asked flippantly.

A nod from Riggs passed the two of them through the guard, and when they were partially out of earshot, Riggs said in a low tone.

"That's no joke, Schilling. What dictator doesn't want to live forever, and rule over his inferiors, mere mortals? A little toy like that in there, would be the last detail needed to convince a psychopathic egotist he really is a god. And when would be the best moment to strike? Before we fully realized what we had to defend, naturally."

"I hadn't thought much about that aspect of it," Schilling admitted. "I haven't had time to think of anything except how wonderful it would be if—"

"If a man could reach the other

galaxies in one multiple lifetime? Uh, huh. But he's got to have a planet all in one piece to take off from. He's got to have a stable economic system to build his go-buggy."

Schilling saw, as they emerged into the pale early morning, that Riggs was right about the young army patrolling the fence around the Plant. And the entire area within the fence was swarming with plain-clothes men who had apparently risen out of the ground. Most of them were dressed as gardeners, janitors, and parking lot attendants. Two of the latter were working on Dr. Arlich's helio-car, one removing the old wax, and the other applying a new coat. A third Federal man was dusting some compound along the outer wall of the building, at the level where people's hands might touch as they passed along the sidewalks toward the entrances; a fourth followed him with black-light equipment, and a fifth applied a sandblasting gun to the indicated spots, on the granite.

"You birds are thorough!" Schilling exclaimed.

"That's what Uncle pays us for," Riggs agreed, as they got into a black helio-car with a United States license plate and a radio aerial.

They lifted over the town and set down at the restaurant, passing up the roof parking lot, it was still so early that there were plenty of parking-places along the curb. Ran-

dolph's was a big place, open all night, but the bar and main dining rooms were deserted, except for a few late stragglers. Nevertheless, Riggs led the way upstairs, where a waiter greeted him by name and conducted them to a private dining room.

Waving aside the menus, Riggs asked Schilling, "Rare, medium, or well?"

"Rare," Schilling said.

"Two sirloins," Riggs told the waiter, "and plenty of coffee."

"Now, Schilling," Riggs said as the man left, "you will forgive me, I hope, if I seem a little curious, that's what Uncle pays us for. But why did you go through all that song and dance with Morrison just to throw those present off the track? I could have shut them up, anyway."

"It was fun," Schilling said. "You can hear a man tell just so many dirty lies about other people, and then you want to see how he likes his own medicine. But that wasn't the important thing—"

"No?" Riggs asked artlessly.

"No. The important thing is, you can't keep people from speculating. You can polish every doorknob—"

He paused as the waiter came in with a loaded tray.

"Pay no attention to him," Riggs said. "He's one of our boys. Go on."

"They crawl out of the woodwork! O.K. You can polish every doorknob Doc ever touched. You can keep the two or three men in the Plant who actually saw the meter

spin, from telling the newspapers that TIGER howled last night. But several thousand people know by now that the floodlights went on at the Atomic Plant at midnight, and that there was plenty of excitement. What about the operators at the VP Company, for instance? Maybe regulations say they can't peek. They couldn't understand your code if they did. But they know you weren't playing a long-distance chess game. It's not every night a girl gets to put through a call to the White House, and get the President of the United States out of bed—"

"He wasn't in bed, it was morning there," Riggs said, cutting into his steak.

"Just the same, you can't keep the girl from bragging. Do you usually call the President when a Federal employee takes an unannounced vacation, Riggs?"

"Not ordinarily, no."

"Reporters are not noted for their gullibility, Riggs. You keep them out of the Plant all night, won't honor their cards to cross police lines, and then you hand them these emasculated little missing persons stories. They're going to know there is more to this thing than meets the eye. Your office is going to have to come right out with an official statement that you are sitting on something too hot to print. That in itself will start rumors, it always does. People have to have *something* reasonably sensational to whisper about, at least until we find out whether it can be done again."

"You practical men are certainly impractical!" Riggs said. "All you're worrying about is whether it can be done again! That is the least of Uncle's worries; his problem is, whether it *ought* to be done again. You know what my number one order on this case is?"

"No, what?"

"To keep a shadow on you from now on. You look like the man most likely to succeed at doing it again. Why do you think I took over that assignment myself, if it wasn't the most important one?"

"So I'm being shadowed, and I thought we were just going to breakfast! If I'm not prying into security questions, just *why* doesn't Uncle want me to hand him the most marvelous process in history on a silver platter?"

"All you need to figure that one out, is a little common sense. Uncle bought himself what he thought was going to be a super-drooper crystal ball. There wasn't anything in the contract or specifications about a fountain of youth. Assuming he's got it, what is he going to do with it? Has it occurred to you that it would keep Congress and the State legislatures busy for several sessions, just revising the criminal code, civil code, domestic relations statutes, espionage act, immigration act, population control act, and even the traffic laws, to fit this thing?"

"Traffic laws?" Schilling asked, bewildered.

"Yes, certainly. A man of forty has a driver's license. Next day he shows up, sucking a lollipop. He looks like a kid six years old, but his birth certificate proves he was born forty years ago, and, by our present statutes, he is old enough to drive a car. He has been married twenty years, and has fathered two kids. Are we going to give his wife a divorce? If so, who is going to pay the alimony—a kid six years old? Who is going to pay the debts he incurred last year? Does he have to go into bankruptcy before he enters the machine? Suppose we find out he committed a murder, the day before he was rejuvenated. Are we going to put a kid six years old in the electric chair? Or are we going to let him go scot-free, thereby removing all deterrents to murder?"

"Our whole economic system would break down. Merchants wouldn't dare sell anything on time, banks wouldn't dare make loans, the F. H. A. wouldn't dare finance construction, if they had to collect the payments from infants in bassinets. Our national debt would mount to astronomical proportions. All the veterans and the old people drawing pensions would live forever. The government would be providing an old-age pension and free schooling for one and the same person. And who would pay the taxes? When the tax-collector came around, our up-standing citizens would just jump into the machine, and let Uncle whistle for his money."

"Now at last I see why all you



Federal men have to be lawyers to get the job. I hadn't considered some of those points myself," Schilling admitted. "It happened so completely without warning, that I've hardly had time to consider anything, except whether it will be possible to duplicate Doc's experiment. If not, we must not arouse any hopes, it would be too cruel to dangle something so precious as life itself before people's eyes, and then tell them they couldn't have it. Think of it! Power, money—everything else is valueless by comparison."

"Exactly," Riggs agreed. "Which means that this thing could launch an era of corruption in government such as we have never seen before. Who is to administer this thing? The Congress? The Judiciary? Anybody can be bought, if the price is high enough. Mr. Gotrocks is on his deathbed. He can't take it with him. Wouldn't he sign his uranium empire over to the judge who handed down the decision that he might live? Wouldn't he sink his last million into campaign funds to elect a slate of candidates who would pass a bill granting him a whole new lifetime? What a lobbyist's paradise!

"What would happen to Civil Service, Schilling, if it were up to you fellows to decide who had to die and who got the privilege of going into your machine? Suppose we say that only people with good physical health, high intelligence, and unimpeachable moral character, get another chance. But where is there an administrator wise enough

to play God? And what happens when a condemned criminal escapes from the death house, slips into the Plant with an atom bomb in his pocket, and announces that he will blow you, himself, and the machine, to kingdom come, if you don't make him two years old? Are you going to tell him to go ahead and blow up Uncle's property and a few hundred employees, or are you going to make him two years old and turn him over your knee?"

"I wouldn't want the job," Schilling agreed, shuddering.

"That's not the worst of it," Riggs went on. "There are three hundred million people in this country. Say a hundred million of them are women who have reached the age where they lie about it. If they even *guessed* what happened last night, every last one of them would be clawing and fighting to get an appointment at the beauty shop, to get ten years taken off her age, before that snooty Mrs. Jones beat her to it. At present, yours is the only completely equipped beauty shop in the country. How would you like a hundred million women on your neck, Schilling, day after tomorrow?"

Schilling fished his moist and wrinkled handkerchief out of his pocket, and wiped his forehead again. "*Whew!*" he breathed.

"I will be a good boy, Riggs," he promised. "I will be a very, very, good boy. I realize that I am on an awful spot, as the only man outside

Secret Service who understands the straight of this thing. I am swearing off liquor. I will go to bed with a gag on, in case I talk in my sleep. I thought I was doing a pretty good job of making a man sweat, last night, but I see I am just an amateur compared to you."

"Oh, I haven't got started on you yet," Riggs said cheerfully, "Why did you do it?"

"Do what? Make Morrison sweat? Why, I thought I made that clear. So long as there are bound to be rumors, isn't it better to start them, to let on that the big secret is nothing more startling than plain, ordinary kidnaping, plus murder of a key scientist, with disposal of the corpse by time-machine?"

"Certainly," Riggs agreed, "and by the third repetition, Morrison will be a Russky, straight from the Kremlin. We'll be leaving him unchanged, just to use him for bait to trap a whole ring of international agents. It'll get better and better. Did you notice that bleached blonde talking to the bartender as we came in?"

"The old bag winding up an all-night party?"

"She's as sober as you are. She's a Federal agent, one of the best. She's been busy telling everybody who will listen that she saw Morrison led out of the Plant in handcuffs. She has lots of help. By noon, every barber, taxi driver, and bootblack in town, will know practically every word you said to Morrison, and then some. We really had to spirit him

away, to keep him from getting lynched. Much more effective that way than if it appeared in the newspapers, and nobody is officially quoted."

"Riggs, your efficiency awes me. But why, then, are you making me defend my position? Apparently you agree that we should create a diversionary action—"

"We? Didn't you create it? My men are merely amplifying it."

"Well, yes, I guess I did—"

"Why?" Riggs asked mildly, looking intently at his tilted coffee cup. "You thought, perhaps, that the Secret Service also needed a little diversion?"

Bob Schilling had suddenly lost his appetite. "No, of course not. I . . . well . . . I—"

He realized he was being put on the defensive, and he wanted none of that. He switched to aggression. "Look here," he protested, "you let me rattle on, didn't you? You even told me I was doing a good job!"

But Riggs would not abandon his advantage. "Since I let you rattle on, what made you get cold feet? What made you decide I wasn't swallowing the Morrison gag, that you had better come clean and admit you knew the truth?"

"Why, Riggs, I never intended to mislead you for a minute! It was just that there were other people there—"

"And you couldn't take me aside sooner instead of later?" the Secret Service man asked.

"Well . . . oh, all right, Riggs, you

win. You'd worm it out of me eventually, anyway. But you've got to understand how I felt—"

"Go on."

"It hit me hard when I verified my hunch that Doc's thumb print and the 'kidnaped' baby's thumb print were identical. Doc was my friend. How would you feel if one of your best friends, a man whose ability you respected highly, were committed to an institution, to lie in a foetal position? I couldn't bear to look at the baby, and at the same time, I wanted to protect him. I didn't want other people to know he was—a freak.

"It was terrible, and wonderful. Eternal youth, mankind's sweetest dream, so near, and yet so far. Doc was past telling us how he did it. Somebody had to find out, and that would take time. If the experiment succeeded once and then failed, it would be too tragic. I couldn't inflict that kind of grief on anybody else, I would have to bear it all myself."

"And Mrs. Arlich?" Riggs prompted.

"Yes, of course, Stephanie was there. I thought of how it would affect her, too. I was glad she was taking charge of the baby, I was proud she sensed that was the important thing. But would she be able to treat him—naturally—if she knew what he was? And think how the papers would knock her around! It will be hard enough on her with Doc billed as flying the coop. They

will dig all the May-and-December marriage stuff out of their files, columnists will make dirty hints and suggest that Stephanie drove him to it. But the truth would be even more sensational. You can imagine the visitabs, with a picture of her alongside one of Doc in his second incarnation, so to speak. 'Step right up, folks, the only woman in the world married to a six-months-old baby.' They would make a regular side show of it."

"And if people knew the truth, she wouldn't be a widow, is that it?" Riggs put in.

Bob Schilling's face flushed. "Well, yes, I guess I thought of that."

"Are you in love with her, Schilling? Don't answer if you don't want to, but I think Uncle ought to know."

"Benevolent old cuss, isn't he! Yes. For a long time. But she was Doc's wife. I swear to you, Riggs, I wouldn't hurt Doc in any way. I believed his particular abilities were important, even if the powers that be didn't seem to agree with me any more. I knew that an emotional upset could disturb his work as much as surgery on his brain. And, Riggs, I wouldn't put him into his blasted, blessed machine, not so long as there was any unknown quantity in the equation. I would have stopped him if I had any idea."

"I believe that," Riggs said.

"Do you have to question Stephanie on that point?" Schilling asked anxiously. "She doesn't know it. I have never given her any in-

dication. Are you going to tell her what I said?"

Riggs indulged in a one-sided grin.

"That's your job, Schilling. Uncle doesn't pay me for playing John Alden. But enough of that. You didn't think the truth should be publicized prematurely—"

"Yes. For a minute . . . kind of a wild minute, I guess . . . I thought, the best way to keep a secret is if nobody else knows."

"Not even Uncle?"

"Not even Uncle, until I could file a full report. How the thing could be repeated at will. What settings got what results. Effects on the health of experimental animals, and so on."

"Especially not Uncle?" Riggs asked.

"I don't know what you mean by that."

"Did you believe that further experiment with the machine would be blocked if the government knew the truth?"

"No, that never occurred to me. As a matter of fact, I assumed that if it were televised all over the country, they would pass a whopping new appropriation. But there would be an awful letdown if they passed it and then nothing more happened. A worse letdown than the other time, when people thought for about two days that a mouse had traveled into the future."

"Then, although the government had at no time authorized rejuvena-

tion experiments with its apparatus, but only time-travel experiments, although Dr. Arlich was the only man authorized to make experiments of any kind with the machine, although he was . . . ah . . . in no condition to make experiments or give advice, and though your function at all times had been purely supervisory, in your capacity as Plant superintendent, you intended to go ahead quietly and without government authorization or knowledge, making experiments yourself?"

"Yes, that's right," Schilling admitted. "Or maybe it wasn't right, but that was what I felt I had to do."

"So you dragged Morrison across the trail, to set me baying after a red herring. Now we're back to a previous question, that you didn't answer. What made you abandon your plans, admit to me that you had found out the truth? Did you decide your charges against Morrison weren't convincing enough to keep us busy? You presented a good case."

"Too good. Morrison's quirks make him dangerous, wherever he works. He's efficient enough at his job, but he can't keep from spreading verbal poison. He really was instrumental in getting Doc's project pared to the bone; I really believe he pulled that mouse trick and tipped off the papers, though I've never been able to prove it. When he started making cracks about Stephanie, I wanted to see him sweat. But actual jeopardy for a murder he

didn't commit? If it came right down to a question of his life, I would testify for him. As you realized, the correct computation was not to punish him, but to get him cleared."

"But Morrison's fate wasn't the important thing?"

"No. There isn't enough resemblance to give most people any ideas—Doc's beetling eyebrows, his double chin, his once-broken nose, his blue-black five o'clock shadow—no baby could look like that. When the kid grows a little more hair, even the resemblance of the bald head will be gone. I doubted that anyone but me would compare the fingerprints intentionally. But his cards and the baby's cards would be together in a file folder of the case; you might notice, quite by accident, that the prints were identical."

"In other words," Riggs interpreted, "you came to the rather belated realization that Uncle doesn't pay his boys to be deaf, dumb, and blind? That you couldn't get away with it?"

"If you want to put it that way," Schilling conceded, uncomfortably.

Riggs, having finished his steak, tilted back his chair. "I'm glad you finally realized that. It saved me the distasteful job of leaving the machine apparently unguarded, and grabbing you in the act. I hope you understand, now, *why* we couldn't let you get away with it?"

"And *how* I do!" Schilling agreed emphatically. "Riggs, it's like cutting my arm off, when you say that

Doc's experiment mustn't be repeated. But I understand now that I haven't the judgment—that no single man alive has the judgment—to decide whether society is ready to have a force of such power turned loose. It must have been like this in the early days of nuclear fission, it could do such an awful lot of good, and such an awful lot of harm. I've felt bad, several times, when new developments couldn't be applied in the Plant, because they would create an uneconomic amount of technological obsolescence. But this time, it's our whole social structure that would be rendered obsolete."

"Exactly," Riggs agreed. "And now that your confession has been recorded, shall we file it and forget it?"

"You mean you're not charging me with anything?" Schilling demanded incredulously.

"What for? You didn't *do* anything. You only thought about it. So far, Uncle hasn't gone in for thought control. But thoughts sometimes lead to actions, and in that case, we could prove premeditation, malice aforethought, and so on."

"What a relief," Schilling said, pulling out the handkerchief again, and after one look at it, substituting a napkin. "I thought I would be up for treason, at least."

The need of concentrating on his own immediate problems having been lifted, he looked curiously around the room. "How many restaurants in this town do you have

wired for sound?" he inquired.

"This was a special job, rigged up after you mentioned steak. We like to have the customers relaxed and comfortable."

"I see. You leave the cruder and less effective third-degree methods to the local police."

"Which reminds me: How come you didn't eat your steak after we went to all that trouble? Tough?"

"Are you kiddin'?" Schilling asked.

"Oh, well, your houseboy can fix you a little something after you get home. Shall we go?"

"Houseboy? I never had a houseboy!"

"You have now. Filipino. Don't worry about his salary. Uncle pays it."

"This is decent of you, Riggs," Schilling said sarcastically.

"Not at all. It might be embarrassing for a man in your job to be trailed by an obvious agent. Also—"

"Don't tell me. Let me guess. Also less effective."

The waiter came in with the inevitable small tray, and Schilling added, "I was going to treat you, but so long as it turned out to be Uncle's party—"

"It goes on my expense account," Riggs finished the sentence for him.

As they walked downstairs, Schilling looked at his watch. "I don't know if I ought to go home. It's almost time to go to the Plant. That is, if I'm supposed to."

"Of course you're supposed to. Plant superintendents don't grow on

trees. But you'd better get a little sleep, first. I'm sure your new secretary is capable of holding down the fort for a few hours."

"Oh, so I've got a new secretary, too?"

"A Miss Smith. I believe you will find her as efficient as she is decorative. If not, we will replace her."

"Hm-m-m. Say, I've often wondered, where do your female operatives carry their guns?"

Riggs laughed. "That information is classified. You'll have plenty of opportunity to investigate, but I wouldn't advise it. Miss Smith is one of the instructors in our Judo school."

"You shouldn't have told me," Schilling reproached him. "The employees would get such a bang seeing me tossed out of my own office door."

Schilling laid a restraining hand on Riggs's coat sleeve. "Look, before we get out where we can't talk—You've been asking all the questions. Can I ask just one?"

"As many as you like. Some of them, of course, I may not be permitted to answer."

"Just one. In the Identification room, when I got Doc's fingerprint cards out of the files, and laid them next to the baby's cards, you acted surprised, said you couldn't believe your eyes, and then I went on to whisper in your shell-like ear about my idea of what the machine would do with the polarity reversed?"

"Yes?"

"Was that just an act? Were you egging me on, not for the information, but to find out how much I actually knew? Were you 'way ahead of me?"

"That's what Uncle pays us for," Riggs agreed.

Schilling was still pondering over this startling revelation, when they reached the sidewalk. A rather battered gray helio-car lifted from the roof parking lot, and pulled up at the curb.

"My car!" Schilling shouted. "Somebody stole it!"

A man in a neat gray chauffeur's uniform—nothing flashy—got out and held open the back door.

"May I introduce your chauffeur, Robinson?" Riggs said.

"Glad to know you, Mr. Schilling," Robinson said, touching his cap.

"Hello, Robinson," Schilling said. "Do you report to Uncle every time I sneeze?"

"No, sir. Only if you get a real bad cold."

"These people are primarily your bodyguards," Riggs explained. "You have suddenly become a very valuable man."

"Me?" Schilling demanded. "I thought I was Public Suspect Number One!"

"That, too," Riggs agreed. "But Uncle just *might* decide to conduct some experiments *with* authorization, and in that case—"

"That's the best news I've heard yet!" Schilling said, enthusiastically.

"But haven't you impressed me enough already with the omniscience and omnipotence of Secret Service? Did you have to jump the ignition on my car? Couldn't you lift me back to the Plant in your own car, and introduce Robinson here, in the normal course of events, instead of pulling him out of your sleeve like a . . . like a magician?"

Schilling had been fumbling automatically in the pocket where he ordinarily kept his car key. To verify his suspicion, he ducked his head inside the front door of the car. The key, in its familiar worn case, was in the dashboard.

A wondering expression spread over his face, as he turned again to Riggs. "Whatever Uncle pays you," he declared, "it isn't enough to cover your manifold talents!"

"Thanks," Riggs said, as they shook hands. "Maybe you can convince him of that. I might add, you have suddenly become a very influential man."

Stephanie had changed in the past few weeks, Bob Schilling thought, as she opened the door for him. The wistful shadows were gone from under her cheekbones, she had filled out a little. Her dark hair was not done up as meticulously as it used to be, and there was no polish on her fingernails. She had a brisk, confident air that said, "I'm in charge here, and equal to all emergencies," an air common to all mothers who are not terrified of their offspring.

The house had changed, too. Steam came from the kitchen, where something had recently been boiling. The bric-a-brac had been moved to top shelves. The ash trays had no matches beside them. The baby was lying on his stomach on a play pen pad in the middle of the living room floor, wearing a yellow knit romper decorated with an appliqued rabbit. He was chewing soberly on a pink plush giraffe. Like most babies his size, he looked very wise.

"Is that sanitary?" Schilling inquired, by way of greeting.

"They all do it when they're teething," Stephanie said. "You can't keep them in a glass case. I'm glad to see you, Bob. They don't let many people in."

"I came to talk to you about the baby," he said as they sat down on the davenport.

"Are they going to let me keep him?" Stephanie asked, anxiously.

"I've gone so far as to get him declared a State ward," Bob said. "Now, if you get a license, I can get him boarded out to you."

"Why won't they let me adopt him and be done with it?" she said, impatiently. "He hasn't anyone. I haven't anyone. We need each other. I have enough money to take care of him, raise him decently, educate him."

"You don't seem much worried about his parents showing up," Schilling said.

She looked at him narrowly, but didn't answer.

"Stephanie, that's not all I have

to tell you. I've been arguing with myself, pro and con. This is top secret. Just about as top as anything can get. It's my neck if it gets out that I told you."

"What do you take me for?" she asked, scornfully.

"Do you feel all right?" he inquired.

"Certainly. Never felt better."

"Well, I mean, you've had a pretty severe shock already—"

"And I'm not wearing black. You can't wear black when you've got a baby to take care of, lint gets all over your clothes. Spill it, Bob. I can take it."

He looked around. "Have you got a maid?" he asked.

"Just a woman who comes in to clean. She's not here today. My so-called yard-man is down by the gate, matching pennies with your so-called chauffeur, and the windows are closed. Nobody will hear us, unless I scream."

"And you're not the screaming kind. But just the same, now that it's got right down to it, I don't know whether I should tell you—"

"Bob," she said smiling, "I hate to see you squirming so. Are you trying to tell me that my husband, and the baby here, are one and the same person?"

"What a woman!" he exclaimed. "Did you compare the fingerprints?"

"I didn't get a chance. The Secret Service clean-up squad was here that same night; they went over tables, doors, dishes, everything, with



cleaning fluid before I got back from the Plant with the baby."

"Before you got back! Then what Riggs said was true; he *did* know about it before I told him! But I can't figure out when and how he discovered it. I got to the Plant about the same time he arrived, and I saw everything he did, right up to the time we went to the Identification room together."

"Maybe he has E. S. P.," Stephanie suggested.

"Maybe you've got it yourself," Schilling countered. "How did you know?"

She shrugged. "Oh, I don't know. I just knew."

"And that's a typical woman's answer, too! Exasperating!"

"Perhaps it is. But I knew, as soon as I saw the baby, that George had found a way to give me what I have always wanted, a child in his image. Look, I'll prove to you that I've known all along." She called

softly and sweetly, "Geor-gie!"

The baby dropped his giraffe, crawled around, facing them, and tried to pull himself up by the rungs of his play pen. He was talking joyously, but he wasn't saying anything.

"See!" Stephanie said proudly. "He knows his name. Isn't he smart?"

"Well, I don't know," Schilling said doubtfully. "Even a dog knows his name. Stephanie, do you think that's safe?"

"Why not? What would be more natural than my naming my adopted son after my deceased husband, since we never had any of our own?"

"I guess you're right. But . . . doesn't it give you the creeps, to call him that? Have you stopped to

think what he would have been, if the power had been left on the full twenty-five minutes—if the foreman hadn't shut it off sooner?"

"He would have been an incubator baby, I suppose," she said, matter-of-factly. "Look," she added, "I don't like your attitude, not a bit. I know how to cure it."

She stepped over to the play pen, picked up the baby, bounced him a little, and without warning, deposited him in Bob Schilling's lap. Schilling's arms remained stiffly at his sides.

"Well," Stephanie said laughing, "he has on rubber pants, and he won't bite."

The baby's small fist encircled Bob Schilling's thumb, and he brought Bob's unresisting hand up to a cherubic mouth, inserting the forefinger as a substitute for the pink giraffe. There were only two incisors, they were tiny, but sharp.

"Ouch!" Bob said, withdrawing the injured member, "the heck he won't!"

The baby let out an indignant howl at being deprived of his teething ring. "What am I supposed to do now, let him bite it again?" Bob asked helplessly.

"In a case like that," Stephanie said judiciously, "I would recommend tickling his stomach. That almost always works."

Cautiously, Bob tried it, finding it necessary to support the baby's back with the flat of his left palm as he did so. For a moment, it was toss-

up as to whether the baby was laughing or crying, but the issue was not long in doubt. He was laughing, a gurgling, infectious laugh, and soon all three of them were laughing.

"That's better," Stephanie said, sitting down again. "I'm glad to see you're not actually afraid of babies after all."

"This is something nobody ever came up against before—a sixty-year-old baby."

"He feels just as warm and sweet and cuddly as any other baby, doesn't he?" Stephanie demanded.

Bob was holding the child, now, the way a baby ought to be held. "He sure does. And, you know—I'm no judge, of course—but it seems to me he's even a fairly good-looking baby. His ears don't stick out."

"He's a perfectly beautiful baby!" Stephanie said indignantly.

"Do you . . . do you think he remembers anything?" Bob asked. "I'd still feel kind of foolish, reading him nursery rhymes."

"He loves nursery rhymes," Stephanie said. "And he'll love them even better, when he gets so he can understand the meaning as well as the rhyme. We play 'this little piggy' every time he has a bath. If he doesn't remember how to feed himself, you don't expect him to remember calculus, do you?"

"I suppose not," Bob agreed.

Stephanie possessed herself of the baby's left hand, held it palm up. "You remember that acid burn George had on his left arm?" she asked. "He'd had the scar since long

before I knew him. You don't see any trace of it on this perfect skin, do you? That's the way it is with the other scars, the mental scars. All the hurt, all the wounds to his self-confidence, they're all gone. His mind is the same as it was the first time he was six months old. Potentialities—I. Q.—very high. Acquired knowledge—no more than any other baby six months old."

"But what a waste," Bob said. "If only the knowledge could be retained, added to—"

"Not half the waste the ordinary process of senility and replacement by reproduction is. Here we know the aptitudes, the potentialities, the possible flaws and faults. We don't need to waste time looking over the whole field of human endeavors to find out what he is best fitted for—we know. You know, I've thought about this a great deal, Bob—and it's far more gain than loss.

"Old George was unsure of himself, unhappy, already pretty well along in years, actually, and approaching retirement age. The most brilliant period of his mental life was passed, and he was sloping down toward twilight. He was laboring under a life-long accumulation of hurts and bafflements and inadequacies—or at least, things he thought were inadequacies.

"But young George here has a whole new lifetime to work in. The last time, George's father was very much opposed to his studying the sciences, you know—he wanted him to enter the ministry, and George

simply wasn't fitted for that. It wasn't until he actually broke with his parents and started earning his own way that he got started. And then it took longer than it should have to earn his doctorate, with the need of working at the same time."

"I can see your point," Schilling said. "The more one thinks of this thing, the more ramifications it has. I can see that the second lifetime, with foresight provided by hindsight, could be much more productive than the first."

"There are physical factors, too. I suppose you realize that George was very sensitive about his height, or lack of it. His diet was none too good, the first time he was a child. Then, the endocrine make-up. I have talked with the pediatrician; I did a little lying, told him in strictest confidence that I knew the baby's parents, that they were both very short. He says something can be done with pituitary, and B-12, at just the right time."

"That's a very ambitious program," Bob Schilling said. "It depends entirely on whether you are allowed to adopt him."

"Entirely."

The baby created a diversion by crawling from Bob's lap to Stephanie's. "Hey, there, young fellow," she said. "It's not every day your Uncle Bob gets to hold you."

"Keep him," Bob said, "I . . . I like to see the two of you that way. Stephanie, I suppose you realize that you would have a much better chance of getting to adopt him, if

you weren't . . . alone . . . if you had a husband?"

"I realize it very keenly," she said.

Bob examined his fingernails. "How long does it take to declare a man legally dead?" he asked.

"I've already asked my lawyer. Seven years."

"That long!" Bob said, dismayed.

"When there is no evidence of death, other than disappearance," she said. "They call it the Enoch Arden law."

Bob Schilling was silent for some time. Finally he said, "In a way, I wish the Temporal Reactor could really take a stitch in time, instead of doing this safety-pin job."

"Isn't this even more wonderful?" she asked.

"Yes, if we knew how he did it, it would give mankind all the time there is. But this is personal. I'd like to take a stitch in time, myself."

"I know," Stephanie said quietly, stroking the soft down on the baby's head.

"You know everything. All right, Miss Smarty, how long a stitch?"

"About seven years," she said, twinkling.

Bob Schilling had never tried it before, but he found that hugging a woman and a baby at the same time was not at all difficult. It was warm, and natural, and very nice.

At long last, Stephanie disengaged herself. "You don't need to smother him," she said. "If you want to wait and have lunch here,

it'll be time for his nap. But, Bob, you said, 'if we knew how he did it.' You don't know how to do it again? Or haven't they let you try?"

"That's a long story. For a while, I thought they weren't going to let me try. I'll explain more about it, some time; for now, it's enough to say that this process could create some pretty involved social chaos, in the absence of legislation adequate to handle it."

Stephanie nodded.

"Riggs—the Secret Service Bureau chief—went out of his way to scare me out of a year's growth. He gave me to understand that hanging would be too good for me, if I tried to duplicate Doc's experiment without authorization. Then, after some top-drawer conferences, Uncle reversed his position, and I got orders to drop everything and get busy. I had twenty-six assistants, all trained scientific technicians, and all Secret Service men. I don't know where they get so many specialists."

"My yard-man is a very good yard-man," Stephanie said. "The place never looked this starched and ironed before."

"My chauffeur is a good chauffeur, my secretary is a busy executive's dream, my houseboy can cook in six languages. But you don't know what the Secret Service can do, because you didn't see how they spirited a whole menagerie of antiquated cats, goats, and pigs, into the Plant without anybody but me knowing what was going on. They brought them

in at night, crated, and kept them under sodium pentothal, so there wasn't a mew, ba-a, or oink. From this, I hope you gather that you are not supposed to quote me."

"I am all three monkeys. But don't keep me in suspense."

"Say, I just now thought of something," Schilling said. "If Riggs knew what happened that night, before I did, how come he let me blunder around and find out? Once I knew, he went to an awful lot of trouble to keep me from letting the cat out of the bag."

"Maybe they wanted you to know, and didn't want to come right out and tell you," Stephanie said. "But will you please go on about the experiments?"

"Nothing happened. Not a thing, or rather, the same thing that had always happened before; the animals disappeared. We worked for three weeks, every night. We tried everything but an elephant—there wasn't room for an elephant. Doc had reversed the polarity on the machine. We tried that hookup, about a hun-

dred times. Then in desperation, we restored the original hookup. We tried single runs, double runs, split runs, with first one polarity and then the other. Either way, the animals disappeared. The records of those experiments aren't in the Plant; they're all recorded, but I guess they're buried with the gold at Fort Knox. They add up to exactly nix. Then we got orders to lay off, and shut up."

The baby started whimpering.

"Why you poor dear," Stephanie exclaimed. "Here it is, ten minutes past your lunch-time, and I haven't even boiled your egg! Want to come in the kitchen and help feed him, Bob?" She put the baby to her shoulder, and started out of the room.

"Wait a minute," Bob exclaimed. "Aren't you interested any more? What do you suppose we failed to do, that should be done to make it happen again?"

"Georgie will figure it out," she said confidently. "When he grows up."

THE END



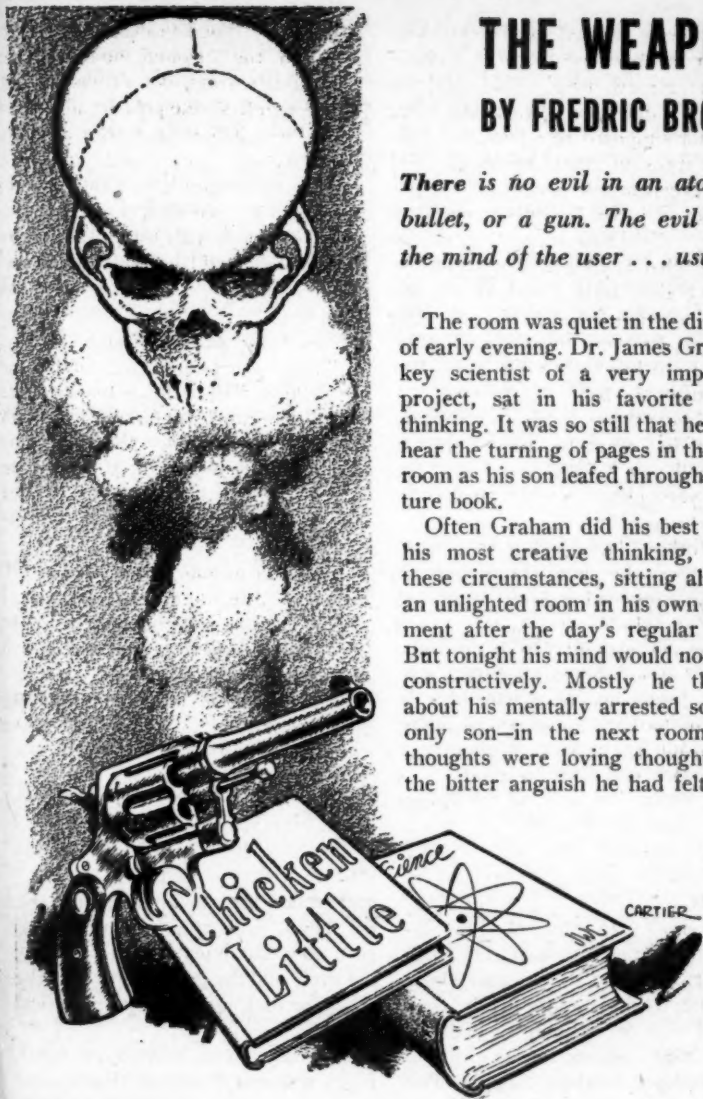
THE WEAPON

BY FREDRIC BROWN

There is no evil in an atom, a bullet, or a gun. The evil is in the mind of the user . . . usually.

The room was quiet in the dimness of early evening. Dr. James Graham, key scientist of a very important project, sat in his favorite chair, thinking. It was so still that he could hear the turning of pages in the next room as his son leafed through a picture book.

Often Graham did his best work, his most creative thinking, under these circumstances, sitting alone in an unlighted room in his own apartment after the day's regular work. But tonight his mind would not work constructively. Mostly he thought about his mentally arrested son—his only son—in the next room. The thoughts were loving thoughts, not the bitter anguish he had felt years



ago when he had first learned of the boy's condition. The boy was happy; wasn't that the main thing? And to how many men is given a child who will always be a child, who will not grow up to leave him? Certainly that was rationalization, but what is wrong with rationalization when—The doorbell rang.

Graham rose and turned on lights in the almost-dark room before he went through the hallway to the door. He was not annoyed; tonight, at this moment, almost any interruption to his thoughts was welcome.

He opened the door. A stranger stood there; he said, "Dr. Graham? My name is Niemand; I'd like to talk to you. May I come in a moment?"

Graham looked at him. He was a small man, nondescript, obviously harmless—possibly a reporter or an insurance agent.

But it didn't matter what he was. Graham found himself saying, "Of course. Come in, Mr. Niemand." A few minutes of conversation, he justified himself by thinking, might divert his thoughts and clear his mind.

"Sit down," he said, in the living room. "Care for a drink?"

Niemand said, "No, thank you." He sat in the chair; Graham sat on the sofa.

The small man interlocked his fingers; he leaned forward. He said, "Dr. Graham, you are the man whose scientific work is more likely than that of any other man to end the human race's chance for survival."

A crackpot, Graham thought. Too

late now he realized that he should have asked the man's business before admitting him. It would be an embarrassing interview; he disliked being rude, yet only rudeness was effective.

"Dr. Graham, the weapon on which you are working—"

The visitor stopped and turned his head as the door that led to a bedroom opened and a boy of fifteen came in. The boy didn't notice Niemand; he ran to Graham.

"Daddy, will you read to me now?" The boy of fifteen laughed the sweet laughter of a child of four.

Graham put an arm around the boy. He looked at his visitor, wondering whether he had known about the boy. From the lack of surprise on Niemand's face, Graham felt sure he had known.

"Harry"—Graham's voice was warm with affection—"Daddy's busy. Just for a little while. Go back to your room; I'll come and read to you soon."

"'Chicken Little'? You'll read me 'Chicken Little'?"

"If you wish. Now run along. Wait. Harry, this is Mr. Niemand."

The boy smiled bashfully at the visitor. Niemand said, "Hi, Harry," and smiled back at him, holding out his hand. Graham, watching, was sure now that Niemand had known; the smile and the gesture were for the boy's mental age, not his physical one.

The boy took Niemand's hand. For a moment it seemed that he was

going to climb into Niemand's lap, and Graham pulled him back gently. He said, "Go to your room now, Harry."

The boy skipped back into his bedroom, not closing the door.

Niemand's eyes met Graham's and he said, "I like him," with obvious sincerity. He added, "I hope that what you're going to read to him will always be true."

Graham didn't understand. Niemand said, "'Chicken Little,' I mean. It's a fine story—but may 'Chicken Little' always be wrong about the sky falling down."

Graham suddenly had liked Niemand when Niemand had shown liking for the boy. Now he remembered that he must close the interview quickly. He rose, in dismissal. He said, "I fear you're wasting your time and mine, Mr. Niemand. I know all the arguments, everything you can say I've heard a thousand times. Possibly there is truth in what you believe, but it does not concern me. I'm a scientist, and only a scientist. Yes, it is public knowledge that I am working on a weapon, a rather ultimate one. But, for me personally, that is only a by-product of the fact that I am advancing science. I have thought it through, and I have found that that is my only concern."

"But, Dr. Graham, is humanity ready for an ultimate weapon?"

Graham frowned. "I have told you my point of view, Mr. Niemand."

Niemand rose slowly from the chair. He said, "Very well, if you do

not choose to discuss it, I'll say no more." He passed a hand across his forehead. "I'll leave, Dr. Graham. I wonder, though . . . may I change my mind about the drink you offered me?"

Graham's irritation faded. He said, "Certainly. Will whisky and water do?"

"Admirably."

Graham excused himself and went into the kitchen. He got the decanter of whisky, another of water, ice cubes, glasses.

When he returned to the living room, Niemand was just leaving the boy's bedroom. He heard Niemand's "Good night, Harry," and Harry's happy "'Night, Mr. Niemand."

Graham made drinks. A little later, Niemand declined a second one and started to leave.

Niemand said, "I took the liberty of bringing a small gift to your son, doctor. I gave it to him while you were getting the drinks for us. I hope you'll forgive me."

"Of course. Thank you. Good night."

Graham closed the door; he walked through the living room into Harry's room. He said, "All right, Harry. Now I'll read to—"

There was sudden sweat on his forehead, but he forced his face and his voice to be calm as he stepped to the side of the bed. "May I see that, Harry?" When he had it safely, his hands shook as he examined it.

He thought, *only a madman would give a loaded revolver to an idiot.*

THE END



DOG

BY OLIVER SAARI

When a machine goes wrong, it frequently earns the engineer's disrespectful referrent "dog". But this one earned it doubly—and in a new way!

Illustrated by Ward

I knew something was wrong, the minute Jason Ford came in. He had just the faint suggestion of a tan and a day's growth of beard—the kind of a face that goes well with a hatful of fishhooks. But there were dark shadows under his eyes and a tight-drawn look about his mouth. He gave a disgusted look around the lab, nodded to me, and sank into a chair, hands in his pockets.

"I see they got to you all right," I said, putting down my soldering iron and going over to him. "How's the wife and boy?"

"Mad," he said, biting the word. "Burned up. She stayed at the lake."

I nodded sympathetically. It was a legend around our sweatshop that Jason Ford had been called back the second day of his honeymoon—six

years ago—to tackle a rush assignment.

Ford sighed and fished a telegram out of his pocket.

"That reached me the first day out," he said. "I don't blame Lisa for being mad. Feel a bit messed up myself. We'd both been looking forward to this vacation."

I craned my neck to see the telegram. It was signed "A. N. Griffith, Vice president in Charge of Research." Griffith had been heard to say he had a lot of faith in Ford—liked to put him on the tough ones because it made him rest easier. Right now it wasn't making Ford rest any easier. He looked like a model for a picture labeled "Operational Fatigue."

"Too bad," I said. "I guess it's



Vogel's doing. He's been phoning New York for a week yelling for help. Looks like you're the answer man."

I might have added something about the problem he was up against this time, but didn't want to make him feel any worse.

Looking at him sitting there, with a look of tired bafflement on his lean face, I couldn't help remembering how he'd looked seven or eight years before, when we first met. He'd just got out of a big Eastern technical school with a Ph.D. and a string of honors. Getting placed with InCo—that's short for Industrial Computer Corporation—meant quite a lot to him. It was the work he wanted to do. He started at our Chicago branch as a Project Engineer. He was eager.

"Eager" is a word they use to describe young graduates, just out of school. They are all going to revolutionize the industry overnight. After a while they realize that original work isn't taught in textbooks, and settle down to the long, unglamorous grind.

Not so Jason Ford. He was eager in a different sense. While there might have been something naive about his enthusiasm, the same couldn't be said of his ideas. They were hot.

I was assigned to help him on his first project, mainly because I was a rookie lab technician and the boss always attached me to the potential Goldberg artists, figuring two wrongs might accidentally make a right. About halfway through the job

Ford's enthusiasm infected me. I got so I forgot to punch the time clock or eat my lunch. I even stayed overtime without being asked. In just a couple of weeks we put together the cleverest little computer hookup that I've ever seen. InCo has since made many a lovely dollar from the patents on that gadget.

"Look," I said, "if you'd taken my advice and gone into business for yourself, they couldn't call you back like this."

"I'm not complaining about the work," said Ford stubbornly. "And this outfit with its equipment and big budget is fine— It's just that lately they won't let me finish anything. If there's anything I hate it's to leave a job half done."

"Or a vacation," I said. "You're too conscientious. Why didn't you tell them to go jump?"

"That's what Lisa wanted me to do. She's pretty well fed up with all our plans being broken up."

"Well?"

"I couldn't do it, Bill. This job's *big*—the biggest thing I've ever worked on. Besides, if the Dog is acting up, I might be to blame."

"Sure, and so might I. But I'm not worrying about it."

I made a mental note that if I ever hired a man like Ford—a man who was too conscientious for his own or anybody's good—I'd never try to push him. A man like that has to be free to work out his ideas to the end—they're usually ideas worth working on. But a big outfit like InCo is too busy meeting competition to

worry about who does what. Work gravitates toward whoever will do it. There's no end to rush assignments; there's only a shortage of men to give them to.

"All right," said Ford, getting up and squaring his shoulders, "let's have a look at the Dog."

To a layman, Shep I would have looked more like a radio engineer's nightmare than man's best friend, but she was a dog to everyone who knew her. The psychologists said she had canine-type intelligence. We technicians, who had struggled with her for months, called her a dog—female—for other reasons. She covered a floor area about fifteen feet square and weighed nine tons. Her streamlined covers, with the fancy red and gold emblem of InCo painted on their sides, lay in one corner of the lab or hung open on hinges, revealing her insides as a compact jungle of gleaming bakelite, bundled wires, coax cable, and glassy-eyed panels of vacuum tubes.

Her mother was the first successful chess-playing robot, and she'd been sired by the big electronic digital computers of the '40s. Possibly the gleam had been put in her father's eye by Norbert Wiener's "Cybernetics." She was a mongrel; there was even a trace of the old M.I.T. differential analyzer in her lineage.

But she was a mutant.

Her name, the "Self-programming Homeostatic Electronic Parturient Robot," implied that—although she'd inherited the first three characteris-

tics from her ancestors. She was *self-programing* because she didn't need step-by-step instructions to work problems; *homeostatic* because she could alter her own circuits and circuit parameters to preserve her internal stability—her sanity, so to speak. She was *electronic* because her basic organ was the vacuum tube and electricity her blood.

Her mutant nature was shown by the last word: *parturient*. The way Webster's puts it, "parturient" means, figuratively speaking, "about to bring forth an idea, discovery, or the like." That's what Shep I was doing—literally creating ideas.

She'd already proven herself capable. The only trouble was, nobody knew how to make her keep working!

Ford let out a deep, audible sigh as we stood before the machine.

"The first machine capable of independent creative thought," he said, almost to himself; then added with more heat, "I don't know, Bill. This is the biggest thing since the atom. Maybe bigger. I don't know why I feel so lousy about it."

"You're going to have a free hand, anyway," I said, looking around the room. It was a little past the usual quitting time and no one else was there. The Chicago engineers had had their fill of the Dog; they'd yelled for help and washed their hands of it. The problem was very neatly jockeyed into the lap of Jason Ford.

Wearily he stepped up to the machine and sat down in front of it.

"I see her memory's been left alive," he said, nodding toward the light that glowed like a red eye in the instrument panel. "Who played with her last?"

"Vogel. He couldn't believe the Dog was balking—had to try it himself, finally."

Ford nodded absently, running his fingers softly over the keyboard. He looked strange, absent-minded. I could see he was trying hard to think about the problem.

"Look," I said, "let's forget for a while that the thing doesn't work. Let's think about how it's *supposed* to work."

He relaxed a little. I thought, *maybe I can get him talking about it, like in the old days.*

"All right. Any questions?"

"Plenty," I said. "I've soldered a million connections on that thing and I still don't know how it's supposed to work."

"O.K. Shoot."

"What's the Brownian Movement and photocell hookup for? I should think—"

"Randomness," broke in Ford. "It's the most random triggering action we could think of."

"Why does it have to be random?"

"To be independent—to make independent trials. Any cyclic mechanism to force its think-tank into certain channels would defeat its purpose."

"I see. And it remembers only the successful trials?"

"It remembers—and generalizes without being asked to. It recognizes

similarities in certain problems and gains an intuitive approach all its own. For instance Laplace's Equation in Partial Differential Equations—"

"Yes. Yes," I said hurriedly, "I understand she's supposed to learn from her own experiences. That's why the power in the memory cells is left on."

"Turning it off would wipe out her memory—kill her," he nodded.

"It doesn't seem to hurt to turn the rest of her off. She sure eats up the juice when she's going full blast."

"It's just like putting her to sleep," he said. "The memory's the only—"

He didn't finish, because at that moment Vogel walked in.

Vogel was Chief of InCo's Chicago branch. He was a tall, beefy individual—the expediter type, with lots of push, lots of drive of the wrong sort. I didn't like him, though the fact that he was my boss might have been reason enough.

There's a Principle of Least Effort that sometimes works in big organizations: do the minimum of work, because by so doing you are making less mistakes and stepping on fewer toes—*ergo*, you are promoted. Vogel had run a faultless record of no-accomplishment all the way up to an important executive position.

"How about it?" said Vogel to Ford. "When can we get under way?"

"I just got here," said Ford testily.

"I know but . . . well, we've got a schedule to meet on that contract.

We're a month behind promised delivery now. Let's keep pushing it."

"O.K." Ford said, lighting a cigarette and leaning back. "How about a resumé of the problem? I understand you've killed and dissected our Dog twice with inconclusive results?"

"It's all in the reports," said Vogel, opening a safe and pulling out a batch of reports and data books.

"Three months ago you had the machine assembled," Ford went on relentlessly. "She worked all right up to a point. She went right through the training and test program, faster than expected. Then, all of a sudden—"

"You'll find the data books on the test complete," said Vogel. "We've cleared her memory twice, and varied her training program. Now she's balking again. There must be something basically wrong in the circuits."

"Any idea what it is?"

"You'll have to talk to the boys about that—call anyone you like," said Vogel hastily, glancing at his watch. "I have to make a meeting."

He was out of the door before Ford could open his mouth again.

"What the—" swore Jason, turning baffled eyes toward me.

I shrugged my shoulders, but I knew what he wanted to say. It was a standing joke around our lab that the quickest way to get rid of Vogel was to ask him a direct question and wait for a direct answer.

"It's kind of late in the day to start working," I said. "How about

having dinner at my house — pot luck?"

Ford looked reluctant.

"I intended to stick around and get started while it's quiet in here—"

"Come on!"

"All right—thanks. Got to stop at the hotel and drop my luggage first. O.K.?"

What could you do with a guy like that? He'd come straight over from the station!

"Sure," I said, forcibly holding back some remarks. "I'll call my wife and let her know."

Later, as I turned the car into the stream of traffic on the Outer Drive, I watched Ford from the corner of my eye. He was staring straight ahead, with the reports and data books piled on his lap. I hadn't been able to get him to leave them at the lab.

There was a warm blue sky and a breeze from the lake that was refreshing—a nice day, for Chicago. Whitecaps played along the shore and among the pilings. Pretty girls in bathing suits walked on the grass by the road, or lay on blankets in the sand. And still Jason Ford just stared straight ahead, lost in thought.

That was when I began to really worry about him.

We stopped at the hotel and I stayed in the lobby while he went up and shaved. He came down with two or three reports under one arm.

of "What are you doing with those?"
I asked. Oh, I said, "just how they

"I thought maybe I'd get a chance to—"

"Take 'em back up or you get no meal!"

He looked a little peeved, but took the reports back up to his room.

We came in as my wife was setting the table.

"Why, hello, Mr. Ford," she said.

"Bill tells me they got you out of your vacation. If it weren't for that, I'd say it's nice to see you again."

"Likewise," said Ford.

My two little kids—a boy and a girl—came up to stare round-eyed at him.

"I know who *you* are," said the little boy, aged five. "You're Mr. Ford."

Ford's tense face relaxed a little and a suggestion of a smile broke out at the corners of his mouth.

"You should," he said to the boy, picking him up by the armpits. "You sat on my lap the last time."

I might say here that Ford always had a way with kids. It was a rotten shame he wasn't allowed to spend more time with his own. I could almost read his mind. He'd left a little boy just about that age back at the lake with his wife.

"Daddy, can Mr. Ford go to the movie with us tonight?" asked the girl.

"That's right, I did promise you kids. How about it, Jason?"

"Sorry, Bill," said Ford. "I . . . I think I'll go back to the hotel and look over those reports if you don't mind. I'd like to get this thing cleaned up fast."

"Soup's on," said my wife.

All through dinner Ford squirmed and twitched as though he were sitting on a burr. I could see it was no use. He couldn't get Shep I off his mind.

We worked like beavers the next two weeks, surrounded by an air of urgency that infected everybody. My boys—who were ordinarily out of the door at the first peal of the five o'clock bell—submitted to overtime without a murmur as they soldered and unsoldered leads, traced circuits, tested tubes, and jotted down endless reams of data. Even some of the Chicago engineers, who were usually a pretty carefree crew, stuck around to watch the proceedings and offer advice.

And toward the end of those two weeks it became evident that we weren't accomplishing anything!

"Bill," groaned Ford, wiping the sweat out of his eyes with a lab rag, "we haven't found out a thing. She's going together the same as before."

"Might have been a loose connection somewhere those other two times," I ventured, not believing it.

"The same loose connection *twice*? Not a chance. Whatever's wrong, it's more fundamental."

I had the same feeling. Whatever made Shep I quit working was basic, inherent in her nature—the kind of thing that's most difficult and sometimes impossible to find. If she had failed to work entirely, certain procedures would have presented themselves as most obvious, and the

trouble would have been rooted out by brute force. But this almost-perfect operation, this minutely small but fatal defect in Shep's nature, was making even me lose sleep. And I wasn't one tenth as conscientious and responsible as Ford was.

"Maybe the simplified training program you're working on will do the trick," I said lamely.

"We'll soon find out. She's about ready."

That night the two of us stayed over. I called the wife and told her not to expect me before midnight.

Ford sat before the machine, leafing through the pages of his simplified training program. He looked played out. The black stripes under his eyes had grown into ropes. He moved in nervous jerks.

"Here goes," he said.

He threw the memory-control switch first and the red light on the panel came on like an opening eye. Then he threw the main power switch and sat like a wooden Indian until the warm-up signal light came on. With a muffled tapping of mechanical relays and the soft, intermittent whine of servomotors, Shep I stirred and awakened from her sleep.

"First we'll check the digital computer," Ford said, almost to himself. He was completely absorbed now.

His fingers poked at the keys, spelling out problems in simple arithmetic. There was a muffled chattering from the machine and the answers came out of a slot, printed on paper tape.

"Retentive memory."

He tapped more keys, until Shep proved that she could remember.

"Generalized program."

With scarcely a break in her rhythmic chattering, Shep showed us that she could learn and apply the rules of algebra.

After almost an hour of that sort of thing, Ford got up and began pacing the floor.

"She's working perfectly," he said.

"All her functions are in order."

"She's started out like that before—twice," I pointed out.

He sat down again and started giving her more general problems: finding the real and imaginary roots of a certain quintic—a simultaneous algebraic solution—a proof in number theory. It was weird, watching that machine—that inanimate mass of metal and plastic—groping at first, then gaining confidence as she learned her lessons like any human kid going to school. By the end of another hour she had outdistanced her teacher. She could work any problem in algebra as fast as Ford could give it.

We should have knocked off for lunch, but neither one of us thought about it.

"This isn't getting us anywhere," Ford said suddenly. "Did she work this way—the other times?"

"Better," I nodded. "She was a working fool. She graduated with honors."

"Anything special about the problems she couldn't work?"

"No—same type as the training programs. Both times, just when we



thought she was done, ready to be delivered, we'd give her one or two problems more, and *blooie*—no answers."

"None at all? She's supposed to admit defeat if she can't work a problem. Look—"

Ford turned back to the keyboard and tapped out, "Does Aunt Minnie love Uncle Ned?"

"Insufficient data," answered Shep I instantly.

"She didn't even say that," I told him. "She just went on clicking away and didn't say anything."

Ford started pacing the floor again. His face was screwed up. I was afraid he was stripping his gears.

"Look," I said, "hadn't we better knock off until tomorrow? She'll still be there."

"All right," he said finally.

He threw open the main power switch and the chattering relays were stilled, the glowing tubes were dimmed. As we locked the door, only the memory-light glowed balefully at us from the darkness. I had the feeling it was reproaching us for something!

The next day Ford didn't show up at the lab until ten o'clock. He didn't look as if he'd slept much. He hadn't shaved. There was do-or-die written all over his face. He made a beeline for the room with the machine and locked the door. I tapped on it lightly.

"Go away—" he snarled, opening the door a crack; then, "Oh, it's you, Bill. Sorry. Come on in."

I went in and he closed the door but didn't lock it again.

"Dream up any new ideas?" I asked.

He shook his head.

"Maybe she's going to keep on working this time," I ventured. "Maybe she's O.K."

He shook his head again.

"No, I have a feeling we haven't done it. She's going to balk again."

Evidently he'd been thinking about the problem in his room, because he took some folded bits of hotel stationery from his pocket.

"Couldn't sleep," he explained. "Got a couple of problems here to test her intuition and initiative."

"And if she answers them?"

He didn't say anything more, but sat down at the keyboard. I'll swear I held my breath for five minutes, from the time he threw the main power switch to the time Shep I spat out the answer to Ford's second problem with a self-satisfied clatter.

We were still there, neither one of us saying a word, when Vogel walked in.

"Got the answer yet?" asked Vogel.

"No," said Ford bitterly. There was a funny edge to his voice. I could see he was clenching and unclenching his hands.

"We're going to be behind the eight ball on this thing," said Vogel, poking gingerly about the machine, wiping his hands on a clean handkerchief. "Sales Department called me up this morning, said how about

it. How does it look? What can I tell 'em?"

He'd noticed the main power switch was "on," and opened it, ending the hum and bringing the servos and clicking relays to a stop.

Ford ignored the question.

"Why did you do that?" he asked, suddenly very tense.

"Oh . . . you know why. Saves power. We've always done it. Just like putting her to sleep."

"You've always done what?" asked Ford. "Turned her off?"

About this time I began to think Ford was grasping at straws, that his thinking was starting to go around in circles. Vogel must have come to the same conclusion, because a sort of a superior smirk appeared on his face.

"Of course," he said. "It's all in the reports: time of operation, stoppage of operation. Naturally we never interrupt the power to the memory circuits."

Ford sank into a chair, a dazed expression on his face.

"Of course . . . of course—" he muttered.

I couldn't stand it any more, watching Vogel goad him. I drew a deep breath, getting ready to tell Vogel to get out. He must have thought I was going to ask him a direct question because he left. I decided to use some of that breath on Ford—on something his mother should have told him.

"Look," I said, keeping myself from shouting, "what are you trying to do, anyway? You trying to

kill yourself? You look like a corpse!"

"I—"

"Shut up and listen! You're too good a man to go to pot just because Nature forgot to put a safety valve in you. Nobody asks you to work yourself to death. Nobody expects it!"

"But they—"

"They don't give you any rest because you always deliver! Look, supposing you lick this job, right now. You're all in. You know you can't tackle another job without a rest. But they'll give you one! Why? Because they've learned from experience that you're the man to do it. They don't know that you don't have



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sense enough to stop when you've had enough?"

"Wait, Bill, you've said—"

"Finishing a job has to bring relief!" I yelled. "That's what you or anybody else works for—relief. I found that out years ago. If working hard and finishing a job doesn't bring release and relaxation, the chance to sit back and think at your leisure for a while—"

"You've got it, Bill!" cried Ford. He'd got up and started pacing the floor. Something in his voice stopped my harangue. I had the feeling my words had taken effect.

"You see what I mean, then," I said. "Why don't you tell Vogel to take his delivery promises and—"

"No! You've got the answer. *That's what's wrong with our Dog!*"

"What?"

"Look," said Ford slowly, "if you had a real live dog, how would you train it?"

"Why, I . . . I suppose I'd show him what to do, and give him a hunk of meat or sugar or something if he did it."

"Supposing you had a blackjack instead of a lump of sugar. And supposing you knocked your dog out every time it finished a trick? *How long would it perform for you?*"

That was when the answer hit me, right between the ears.

"Blackjack!" I shouted. "You mean the on-off switch?"

Ford was already at the machine, turning on the power. Humming and clicking, Shep I came back to

life. Ford tapped out, " $2 + 2 = ?$ ", his fingers almost missing the keys. "4!" came the immediate answer.

Instantly Ford threw the power switch. We waited a couple of minutes, neither of us saying a word, neither of us breathing very well. Then he threw the power on again. Another arithmetic problem. Another answer. And Ford threw the power off again.

"That ought to do it," he said through tightly-clenched teeth.

He turned the power on again. The half-minute warm-up seemed like a century. Finally the signal light came on.

" $4 + 4 = ?$ ", tapped Ford. Servos whined and relays clicked, but there was no movement of the paper tape. No answer!

Ford sank into a chair.

"We've now taught her that she'll be knocked out if she delivers an answer. From now on she'll work the problems—because that's her nature—but *she'll withhold the answers!*"

Understanding flooded my brain like a sweet deluge.

"I see!" I shouted in my excitement. "The training programs were all continuous, except for stoppages for nights, which she couldn't associate with anything she could sense."

"You've got it, Bill. She may not have liked being turned off, but she didn't know what to do about it—until we started turning her off after isolated problems. She's an expert at putting two and two together."

"Jason, that machine is smarter

than you are," I said. "When solving a problem had an unpleasant result, it knew what to do. It only needed to be knocked on the head twice."

"A creative intelligence can't be turned on and off like a vacuum cleaner," Ford was saying, and I didn't know if he was talking about Shep I or himself. "It has to work in its own way, under its own will—"

Suddenly he jumped up. His eyes looked as if a light burned in his head.

"Bill, how about driving me to the hotel?"

"Let's go!"

I still remember how he looked, running through the hotel lobby. That was the last anyone connected with InCo saw of Jason Ford for some time. Vogel had another hot project which he'd intended to give

to Ford as soon as the trouble with the Dog was cleared up, and I know for a fact that a couple of telegrams followed Ford out to the North woods. What the answers were has never been disclosed.

Vogel's other project lay around for a month without moving. By that time the New York office figured it was time for a change. One day a notice appeared on the bulletin boards to the effect that, on his return from vacation—not dated—Mr. Jason Ford would replace Mr. K. Vogel as Chief of the Chicago Branch. I stole one of the notices; it's in my room now, in a gold frame.

As for Vogel, he was moved up to the New York office. He's now Vice president in Charge of Research.

THE END

IN TIMES TO COME

Next month's cover is a Rogers painting based on "Galactic Gadgeteers," by Harry Stine. Harry Stine is a brand-new author—for the cynics, you have my word this is *not* a pen name for someone else—with an amusing yarn and an interesting idea on how to teach school. And since an author is, in addition to being a producer of entertainment, a personality, I'll add that while this is Stine's first yarn, there is a touch of polished experience to it. Stine has been talking a lot with Bob Heinlein who is living now in the same Colorado town.

There's another touch of experienced writing present, too—one with plenty of experience in these pages. Isaac Asimov has been writing good science fiction for nearly a dozen years now and "Breeds There A Man" shows it. The basic theme of this yarn we've seen before—the "we're property!" idea—but not with *this* development. If you accept that proposition for story purposes, the story develops out of *why* we're property. Asimov has a yarn...

THE EDITOR



PRODIGAL'S AURA

BY RAYMOND Z. GALLUN

An adventuring relative is hard on the home-folks. He doesn't understand their static life; they don't understand his dynamic urges. And when he looses the fantastically hardy, fast-growing vegetation of Mars on Earth — it's not a family problem!

At the Jorgensen farm, it had been present for quite a while. The gnome on the parlor bookcase—molded in clay by a Venusian native—held some of it in his sly grimace. The translucent blue vase, made fifty million years ago on Mars, gracing the dining room table, added a haunting reminder of its existence.

But now, on this twentieth of December, 1983, it leaped back into full life. Mattie Jorgensen—Mrs. David Jorgensen, that is—brought a letter in from the mailbox by the road. From the paper of the envelope itself, coarse in texture, and made, certainly, in a new factory on Mars—from the fiber of great lichens

that thin, dry winds had once blown against—the aura expressed itself as a faint pungence.

The odor was smoky and bitter. Directly or indirectly, it caused Mattie's motherly eyes to water, when she had got back into her kitchen after a brief tussle with the Minnesota winter.

She looked again at the exotic stamp—blue with a white rocket on it, and with a five dollar value and the legend, INTERWORLD MAIL, printed across its top. And out of this bit of cellulose, ink, and distant reality, there seemed to ooze more of an intangible and restless essence. No less was this true of the postmark — BELT CENTER, VESTA, ASTEROIDS.

The elixir or poison that was here, did things to both her thoughts and her expression. In her ruddy face, surprised pleasure fought with a worry that saw the future as a suddenly treacherous thing, full of trials. Her look became at last one of good-humored grimness, and she tore the letter open. The handwriting that she read avidly, though in ink, was of such a nature that it was suggestive of having been rough-hewn out of wood with a hatchet. And Mattie's scared premonition was fulfilled:

Dear Sis:

Hi-ho, and be of good cheer—but hide all the valuables. Am comin' home for Christmas—

Down at the bottom of the page of nonsensical banter, was a signature that looked like the vapor trail

of a rocket gone nuts.

David Jorgensen, Mattie's husband, tall, baldish, blond, big, very serious of manner, and very much in love with his new barns, his blooded cattle, his wheat and corn crops—in short all of the benefits of a philosophy of dogged and cautious industry—had just come into the house after finishing up with his late morning chores. Now he paused to pour himself a cup of coffee, before washing up.

Mattie drew a deep, tense breath. Her smile was elfin—and a bit sad. She spoke in a small voice, and with an air of resignation and timidity—half feigned, of course—but still unbecoming a person of her usually forceful nature:

"Dave— He'll be here tomorrow evening."

Possibly the thing that had spread insidiously through the very atmosphere of the house, had the preliminary effect of sharpening both David Jorgensen's extrasensory powers and his suspicion.

"Who'll be here tomorrow evening, Mattie?" he inquired.

She fluttered the letter feebly in her husband's direction. "Him," she answered. "My baby brother. Augie—" Then, after she drew another vast breath, her words rushed on, as if to soften the shock of fact with explanations:

"I guess it's natural enough for Augie to want to come visit his home folks—especially at Christmas. Even if we haven't had a letter from him in over a year. Ever since you said

no about that . . . that—"

Mattie's voice was stopped dead in its tracks. Now the force that had intruded into a peaceful, well-ordered family, had assumed some of the quality of an electric flash. It kindled the fires of fury in David Jorgensen's pale eyes.

"Ever since I said 'No!' to his latest request for a loan, Mattie," he growled with measured clarity. "What was his Big Scheme that time? A vaudeville troupe to entertain the space-weary asteroid-miners, whom he said could pay a hundred bucks per ticket without even noticing? No. That was before. That first time he got into a crap game out there—with my thousand dollars! Yeah! While somebody else cleaned up with his idea—if it was his."

David Jorgensen paused to replenish the raw material from which lectures are made. He was determined to say what was on his mind, all at once.

"I *had* my lesson!" he went on. "That last time he wanted me to finance his promotion of a new sport in the Asteroid Belt. 'Space-Jumping' was the corny name he cooked up for it. Blasting from one asteroid to another in a spacesuit fitted with a shoulder jet. 'A million times more fun than skiing,' he wrote, if I remember, 'Good for a new kind of vacation trade in the expanding Domain of Man.' Yeah! I wonder how more businesslike people made out with that notion, when I showed sense and turned him down? And

now—excuse me, Mattie—I'm not bringing up any of the classic arguments against in-laws, but the best word in any language for adventurous ne'er-do-wells, is NO! I won't have August Larsen on my farm, mootching, disturbing my peace, gumming up my affairs, and putting silly dreams into the heads of my children! I'll see that he stays in a hotel in Ridge Falls—though I'll probably have to pay the bill myself. Even standing on pure uranium among the asteroids, that elephantine baby brother of yours could never keep a nickel in his pocket!"

Thus the storm raged. But into David Jorgensen's heart had crept cold doubt of his ability to stick to his own antidotes for trouble. That was what had reddened his cheeks, and had made his negatives so vehement. Now he saw more defeat in the sudden angry pursing of his wife's lips; he saw it in the inviolable custom of family hospitality, and in the eternal one-sided struggle between sober haves and brash and forward have-nots. Inwardly, he entrenched for a siege.

His mouth grew hard and tired. His thoughts went way back to the grinning eight-year-old—yeah, Augie—who had bounced hard apples and slingshot rocks off his head when he was well past thirty. And back not so far to a much bigger Augie playing Christmas music on the accordion, and saying that the places he meant to go to were brighter than the star on the tree. A crazy,

harebrained, romantic young hellcat who didn't know that a bigger Tomorrow could be built mostly by the same solid virtues as Yesterday. Yet—gosh, how could you be sure? Those guys always had an advantage. Something they didn't deserve—

David Jorgensen's weary look softened his wife's angry expression to a smile. "Aw, Dave," she teased gently, "don't be stuffy! We'll manage. And it'll be fun to see Augie again."

"I'm *not* stuffy!" David Jorgensen growled with emphasis. "But why does he have to come now—just when I'm trying to get George Munz to sell me those hundred acres for a reasonable price? Isn't handling that old skinflint enough? Him wanting thirty thousand—cash! And now I'll have less cash! Worse, I won't even be able to concentrate my mind on ways and means to make Munz more human!"

Dave's tone was plaintive. It had the sound of inescapable woe.

After an early lunch, he was glad to leave Mattie to her own worries, and to her stepped-up cooky-baking. He was glad to climb into his sleek new ato, and drive to Ridge Falls, and away from the farm, the mood of which seemed now to be charged with the bleak energy of uncertainty. It was like breaking free, a little, from tension.

The ato was a rakish dream, mostly of blue plastic. It rode the blast-cleared rubberized surface of the highway, between mountainous snowdrifts, with all the swift and

silent smoothness of a magic carpet, or a passing cloud. Steam, in a sealed-up system of boiler, turbine, and condenser, was the medium that turned its wheels. But the power, of course, came from the radiation-screened heating unit. Atomic, it was. Its heart was an alloy chunk, containing fissionable elements. It separated into slotted, forklike halves. To get heat, steam, and power, you pushed a little lever that keyed them into union. Then their combined bulk surpassed a critical mass necessary for a low chain reaction. Separate, they were individually below that mass, and gave no heat, except enough to keep the water and antifreeze mixture from congealing—if the climate ever did produce a sufficiently low temperature.

The motor, then, was as simple as that. Its parts were closed in, out of sight. It would last for years, without lubrication or refueling. David Jorgensen thought of these facts, and that the ato was one of the things that was his. Such knowledge was like a bracing force to him—a reassurance that his way of life was right.

Ridge Falls looked bleak under the winter sunshine. Brittle snow crunched under his feet, as he walked to a bar, where he knew he'd find George Munz.

"Hello, George!" he greeted genially, believing this a good opening for the further discussion of a tough business matter.

"Hello yourself, Jughead!" Munz echoed, using Jorgensen's ancient

schoolboy name. Munz's manner was also good-humored. In fact his face, withered like an old apple, seemed but the flimsiest of masks for a vast joke. His thin elbows were bent double casually behind him, as he leaned backward against the mahogany, as if to enjoy some fun that had elements of savagery.

Still, against this cruelly defended front, Jorgensen had to attempt an attack.

"George—" he began softly.

"Shame, Jughead!" Munz mocked. "No bargaining now—please! Don't you know it's almost Christmas? And ain't you got enough to think about at home? Hear you got a letter—from outer space, Jughead."

David Jorgensen gave a short, anguished gasp. The aura, the mood, the disruptive force, had not only taken over his farm—no doubt it was spreading insidiously through Ridge Falls, too, making him an object of pity and laughter—in addition to his other coming miseries. In his mind he seemed to hear the clump of great space-boots, threatening his pride, his possessions, his self-assurance, and his dignity.

"A letter? Who told you that, Raisin-Face?" he growled.

Munz shook his head slowly and sadly. "No manners. No manners at all, Jughead," he responded. "The letter? Oh—gossip. Stuff gets around. With space exploration only seven-eight years old, a letter from Out There is still kind of interesting in Ridge Falls. Maybe some bloke at the post office forgot pro-

fessional ethics in a weak moment, and talked. Then the grapevine took up the news. What does Augie want this time? Or maybe he's even comin' to park in your spare room for a while. Huh? Make way for tomorrow, Jughead!"

Mustering all his will power, and what little histrionic ability he possessed, Jorgensen snickered weakly, in the hope of blunting Munz's satisfaction in his pleasure, and in the accuracy of his guesses.

"You must have had a nightmare, George," he said. "Well, I'll see you another day, when you've recovered from the effects."

Since there was no escape from circumstance, anywhere, David Jorgensen decided to go back home. The mood he was in was no good, even, for buying any more Christmas presents.

But on the way to his car, an old woman chuckled in his direction. A few steps farther on, the sheriff—Ridge Falls was the county seat—slapped him on the shoulder.

"Hello, Dave!" he greeted. "I hear there's news from your planet-trotting brother-in-law."

David Jorgensen was past making any denials. "You'll find out anyway, Frank," he stated hollowly. "Since August first left Earth, my joyful contacts with him have all been by mail. But now he's arriving in person, tomorrow night."

The sheriff slapped Dave on the shoulder again. "Well—that's fine, Dave!" he enthused. "Great lad, that Augie. Always was. Even though

he used to pull some tricks, around Hallowe'en and Fourth of July. A grand bunch, those hardy men who go adventuring in space. But they're human, I suppose; and they might want to kick the lid off some, whenever they get back to Earth. So kind of keep an eye on Augie, won't you, Dave? For his own sake. So he won't do anything he shouldn't."

David Jorgensen said, "Thanks"—which, of course, he didn't mean. No, not when he'd just been tossed another hot potato of responsibility on top of the mockery of the sheriff's other, perhaps well-intended, comments.

Jorgensen felt furious, bitter—and outclassed by a vagabond—by the family black sheep whose success was a vast glamour, and whose power was discord. And yet, for feeling as ungenerous as he did, Jorgensen felt like Scrooge, when he was sure that he had no reason to do so. He had always been a solid, kindly, generous member of society, hadn't he? Was there no justice—even in one's own mind?

On reaching home, he puttered in his largest barn for a while, just to keep away from his family. But it would have made no difference had he gone into the house immediately.

When he finally entered, two of his children—Bob who was eight, and Maxene who was seventeen—had already arrived from their daily excursion to the consolidated school and high school. The bus had brought them home, as usual. Lloyd, who was

nineteen, would arrive from the State University tomorrow. Lloyd, the sensible one, who meant to become a veterinary surgeon. For Bob, of course, there was no hope at all—when it came to the aura that had invaded the household. He was just a breathless, saucer-eyed pushover. As for Maxene, who was blond, beautiful, and usually bored, well, she'd been mainly concerned with ways and means of sifting a suitable husband out of her collection of boy friends. She seemed businesslike about it. David Jorgensen had hopes that Maxene wouldn't be thrown off balance too much by the influence of August Larsen.

As for Bobby—Jorgensen could almost read his younger son's mind by the petulant rapture in his face. Was it hard to see how something of the magic of Aladdin's lamp seemed to rise out of the very paper of August Larsen's letter, for him? Or how the demigods and heroes were stalking in his imagination, inspired by the thought that he would make friends with one of them? To him this must seem already to put a thrilling future into his small, chapped hands. He scowled fiercely from under his thatch of tow. No doubt this meant that he felt the cold silence between worlds, the thrust of rocketships, the harsh, glamorous loneliness. Wonderful! No doubt he chopped his way through rotting Venusian jungles, and saw the rusty, windswept desolation of Mars, with the ruins that had been half fused to glassy lumps, ages ago. War was the

way that its inhabitants, who had been nothing like men, had been wiped out. Jorgensen cursed the wild romanticism.

Certainly Bob's mind was among the asteroids, too—those fragments of a planet that had been blown up by splitting atoms at its center—maybe in a gigantic projectile. Bobby's spine would be tingling gloriously. He knew all about it from scientific picture-books. Whole chunks of landscape, miles in extent, had gone skyward with white-hot fire and the dissipating atmosphere. And the relics of the old civilization that had fought Mars, were still on some of those chunks, preserved in the vacuum of space. Bob had said that Miss Harris talked about such things at school. And about how planets had been formed, with most of the uranium, gold, osmium, and other rich, heavy metals sinking to their centers, out of reach. But among the asteroids, all of this incalculable treasure was exposed—for those who were bold enough to go get it. Bobby no doubt knew, better than ever, that he was going there himself. He plainly felt like somebody favored by Jove—just because his Uncle Augie was coming to visit.

He stared at Dave with big, utterly awed eyes, and he said solemnly: "He'll be here, Pa. Till tomorrow is not so long to wait, is it?"

"No, not so long, son," David Jorgensen answered—because Bob was his youngest, and there was no other way.

Maxene was at the telephone—equipped with a visi-attachment over which, for feminine reasons, she did not always allow herself to be seen. And she spoke, now, with as much casualness as if today belonged to last year. She was talking to Clyde Winters, who was usually her favorite beau. Perhaps her father may have thought that her casualness showed real disinterest in what had happened at home. Or would such an idea on his part, be only the thinking of a tattered wish?

"Nothing much new around here, Clyde," she said musically. "It's really dull. Though my Uncle August is coming. Yes—from Vesta. You know—in space. Of course he's ancient. Almost thirty. A roughneck, I suppose. Would you like to meet him? Maybe we could save him an evening, and try to find him a similar roughneck friend from our own set. Barney Coombs, for instance—the lug who plays football, and is always talking about dull things like other worlds. We could bring him out here some night. Maybe we could duck out, ourselves. But it might be better to stay—for politeness, Clyde."

And David Jorgensen thought, with a certain admiration, of the deviousness of the methods of a woman—even when she was very young. Manipulating her beaux, feigning disinterest in things which were uppermost in her mind—to arouse interest. Jorgensen knew now that Maxene was in Augie's camp, too. She was fascinated by the glamour of interplanetary distance. Al-



most like Bob.

When she had finished her phone conversation, she smiled slyly up at her father. "Clyde is a little cut-and-dried, Dad," she said. "Wants to carry on with his folks' grocery business. I mean to help change him. There could be a place Out There, for a girl, too."

David Jorgensen grunted under his breath. But Maxene kept on smiling at him. "You don't like Uncle Augie, do you, Dad?" she remarked. "And why do you hate the thought

of people traveling to other worlds so much?"

"Listen, Maxie," he growled back at her. "I don't hate space travel! But I do object to reckless, improvident adventurers. They're like overgrown children that need to be taken care of. They put burdens on other people. They are inconsiderate! Without their monkeyshines, space travel would be a wonderful part of progress—"

Maxene became very patient and earnest. "Look, Dad," she said, "I

love you, I wouldn't hurt you or be disrespectful to you for the universe—" She paused to emphasize a point which David Jorgensen knew to be not strictly factual. "But everyone has to ask himself blunt questions about his own motives once in a while," she went on. "Very few of us are really heroic, Dad. Please don't misunderstand me, Daddy. Practically everybody has the same kind of emotional trouble now and then. To cure it, you have to recognize it. So here it is: I think you fear and resent Uncle Augie—because you wish you had the courage to be different, like he is. To do the wonderful things that he has done. Face it, Dad. Make peace with yourself!"

Maxene's tone was pleading. It was almost lugubrious. For a second, David Jorgensen didn't know whether he was going to start screaming or not. But then a leaden tiredness seemed to shove its way into his heart.

"I give up!" he groaned. "I honestly give up!"

August Larsen, "baby" brother of Mattie, black sheep, and adventurer extraordinary for all of the region of Ridge Falls, Minnesota, arrived the next day at the Jorgensen farm, two full hours ahead of schedule. Instead of coming by regular plane, he had rented a Fly-It-Yourself in Minneapolis—a helicopter—which he landed skilfully right beside the Jorgensen house.

It was then that the tense and excited mood that had intruded into

the even pace of David Jorgensen's life, went fairly mad. Mattie, Bob, Maxene, and two of Maxene's boy friends—still managing to look silent daggers at each other—all rushed out into the winter afternoon, even before the blades of the helicopter had ceased to turn.

Lloyd Jorgensen was the first to step down from the craft. His rather prim face was a bit pale. "Surprise, folks," he said weakly. "Uncle Augie picked me right off the campus. Brought me along. Insisted. Here he is—"

David Jorgensen felt a little dazed. He guessed it was the same with everybody—Mattie maybe not so much, because before she even kissed her own returning son, she went and kissed her lug of a brother, cool as you please.

"Hello, Augie," she said, "I'm glad you could come."

He laughed with an easy and brash assurance, swaggering in a new suit that was too small for his shoulders. "That goes ten times double for me, Mattie darlin'," he said. "Hey—there's my boy! Bobby! Only three years old he was, when I left Terra. Seems he'll have the makings of a husky spaceman. What's the matter, lad? Go bashful on me? And here's Maxene. Boyoboy! A real lady!"

David Jorgensen saw that his youngest son, who could be so shrill and eager, was completely awed before this tin god of his—this brass idol. His gaze was down, his lips were sullen and petulant. And it wasn't much different with Maxene.

Her regular way to greet a long-lost relative or friend, would be to throw her arms violently around his neck, with appropriate exclamations of joy.

But here her exuberant boldness was gone. And she gave the returning hero a limp and timid hand, and said: "I hope you will be happy with us, Uncle August."

The "Pleased to meet you, sir," spoken by Clyde Winters, the grocer's son, and repeated by Barney Coombs, the football-playing junior space-enthusiast, sounded more spineless and subdued. David Jorgensen felt the disgust rising in him. Couldn't the younger generation make at least a little better showing of personal integrity before this space-hopping ne'er-do-well, this phony? What was special about him, except that he was an unduly swaggering, self-important boob? Did comet's tails sprout out of his shoulders for wings? And was it so much to have chopped one's way through the steaming forests of one far planet, walked on the deserts of another, or to have gained some firsthand knowledge about the wreckage of a third? What was the matter with people's reactions, anyway?

Last in line of the impromptu reception committee, David Jorgensen, gripped August Larsen's hand with a mitt of equal size, met his hooded gaze with something of about equal power, and then conformed with the others, like a fool.

"Well, well, well, Augie!" he greeted. "You finally remembered us!"

David Jorgensen hated himself for this. But it was a fact that one *had* to be polite and hospitable. And what was that strange, unbidden flash of pride in him? Pride for Augie, who would ask him for a loan any minute, now? Maybe. Though it couldn't make sense. And what was that probing of travel-scarred luggage, with his own eyes? Curiosity for things unknown? Half of David Jorgensen felt silly in a bitter way.

"What's everybody so stiff and formal about?" August Larsen laughed. "Maybe it's the cold, huh? Dave—give me a hand with Pandora's Box, here. Got to get it into the house—"

With Augie around, of course there had to be a minor mishap. Nothing could go smoothly. It was the way his life was. As David Jorgensen gripped the handle of the heavy trunk and hoisted lustily, the ancient leather, doubtless dried out in the arid chill of Mars, or weakened by some subtle radiation of the uranium mines of the asteroids, broke in his hands. And the trunk thumped heavily down on its bottom. A crack, glued together with plastic strips, parted. And from inside the trunk there dribbled thin streams of brownish dust. A little of it clung to the brittle snow. But most of it was wafted away quickly by the swift, cutting wind.

Augie said, "Should have some new luggage." Then he brushed the darkened snow with his glove, and pressed the plastic strips back into place.

David Jorgensen, eyed the disappearing brown dust suspiciously. "What was that, Augie?" he demanded, half wary, but not knowing that in that dust there now lurked Nemesis.

Augie was scowling and silent for a second—maybe it was worry. "Oh, nothing, Dave," he said at last. "Just some stuff I had to smuggle to Earth between the bottom and the lining of my trunk. Too bad I've lost most of it. Because I thought I might make tests. Easy, now, with this old thing. Gently, Dave. That's it—"

In the house, there were cookies and hot punch for everybody. But there was a lot more. For part of the far distances had intruded, here. Bobby fussed with the valves and controls of the spacesuit that his uncle had brought along to show the folks. No doubt each patch on its battered, folded skin, and on its metal parts, rubbed shiny with use, had a story of its own.

Leave it to a kid like Bobby, losing some of his bashfulness, now, to say: "Uncle Augie—you're like a hunk of Mars and Venus yourself, aren't you? 'Cause you ate food that grew there!"

"Sure!" Augie answered. "Sure, Bob. Say—what have we got here? The vase and the clay monkey I sent long ago— Shucks, throw 'em away. I got better, now."

First there were hundreds of photographs in color: Of strange desert sunsets, with stone ruins looming; of buildings that no beings with hu-

man shape could ever have lived in; and of the asteroids. Part of the surface of one showed rows—like an unplowed cornfield in late autumn. There was even some kind of stubble, blackened and charred by the dehydration that had to go on in space.

"You've all heard about things like this," August Larsen explained, looking like an old Viking after a long voyage. "Part of the surface of the original planet, preserved for millions of years after the explosion. It must have happened very quickly. The flash of terrible heat was too brief to cause as much destruction of small things as you might think. The atmosphere of the planet dissipated into space at once. So everything was kept in a vacuum. There's even an old village in the background of this picture. And bodies have been found—dried and mummified by space. Not human, of course. Blackened and crumpled up. But still with fabric and ornaments on them. Here's a picture of one—"

Mattie and Maxene shuddered visibly. Bobby stared. Clyde Winters, Barney Coombs, and Lloyd Jorgensen leaned forward like yokels, their mouths agape.

Augie smiled at them engagingly. "A wonderful region, the asteroids, fellas," he said. "But not just for archaeologists. Take a modern view. Here are more photos. The mines. Full of practically pure metal, the way it is at the center of a planet. And the new settlements, all roofed by transparent, air-tight, flexible plastic, self-sealing against the few

small meteors. Only the strays from out of the Asteroid Belt itself, are dangerous. The others move at about the same speed and in the same direction as the Belt does, since they are part of it. So their relative velocity is almost nil—and harmless. So the settlements are like big plastic bubbles, with air sealed inside. Water and air are produced out of the rocks, and from the frost of moisture that was frozen into the surface soil by spatial cold, after the planet exploded. Farms thrive again, under plastic — producing Earthly crops to feed the colonists. Towns are being built. Prices are a hundred times as high as here. But who cares? Everybody makes money. To everyone out there, life is a Great Experience."

Augie was spreading it on thick—broadcasting the old come-on to eager and gullible ears. David Jorgensen even wondered if he himself was getting gullible—if the old High Romance wasn't taking hold of his aging and sensible blood, making him foolish—making him angrier at himself and his brother-in-law. He was glad for his son Lloyd's growing frown of disbelief, directed at his uncle.

"Oh—don't look at me like that!" Augie chuckled. "I'm a proven wastrel—and not a good example, though I can get along, now. Any kind of game works. I've been a miner, I've entertained with my accordion. I've belonged to a security group, rescuing people cast adrift in space when the shoulder jets of their

armor burnt out. Now I'm delivering all these photographs to an outfit that wants to ballyhoo colonial projects. Great place, the Belt, for rugged souls—even for girls. Want to see mine? Here's her picture. Her name is Rose Mahoney. And how is that for a pair? Irish and Scandinavian?"

The eyes were cool and blue. Her hair was dark but it had copper glints. Even Lloyd perked up and took notice.

"She's out there now," Augie intimated. "Works in a lab. Used to work in an office—out there, too. Hear that, Maxene?"

Maxene's gaze grew pensive. Funny how everybody listened to this jerk—this etheric lug without substance. More propaganda material he didn't need. But he had it. Nothing much. Some other-world fossils for Bob. And a metal ball that always rolled away from light. A flawed asteroid diamond—when there should have been plenty of flawless ones—for Mattie. A huge and rather beautiful opal for Maxene. A rough lump of osmium and gold alloy for Lloyd. But the glamour of the distance and of the ages gilded the gifts, and thanks were starry-eyed and profuse.

Augie ate wonderfully at supper. And afterwards, as he played old Christmas music, David Jorgensen almost forgave him for many things. Maybe it was an old mellow mood. Maybe it was the fact that Augie hadn't yet made a touch. Maybe it

was his giving of presents days ahead, saying, "Christmas starts now, folks." It might have been even David Jorgensen's own gift, a kind of flashlight, ages old, left by the dead people of the Asteroids. It generated brilliant cold light, just from the warmth of his hand!

But Dave's sudden charity toward Augie, soon began to show fresh doubts. For one thing, Augie drew him aside and said: "Dave—Mattie told me. George Munz is being difficult. Bet I could talk sense into him. Anything to repay past favors to you, Dave."

That with a cocky, and self-assured grin. Yeah—when Munz looked upon August Larsen as a screwball. Oh, sure!

And the next morning, Bobby's arms were covered with a red rash—an allergy, the doctor said. Probably some taint brought from Mars. But it didn't make the kid any less enthusiastic.

"Gee, Pop, I got interplanetary itch," he yelled gleefully.

It was no lie. Dave decided that his whole cockeyed family had it, figuratively if not literally. His plans for his children's futures seemed to be vanishing into the thinness of outer space. You could see it in the dazed, adventure-struck looks on their faces.

The phone was ringing constantly. The Civic Entertainment Committee of Ridge Falls wanted August Larsen to give a talk about his off-Earth experiences. Augie's response was,

"Why, sure!" given with engaging aplomb.

"And we can bask in the reflected glory, Dave," Mattie teased.

David Jorgensen said nothing. Oh, no—he didn't mean to be sour. But to reflect the glory of Augie was something he was suspicious about. Besides, it just rubbed him the wrong way, somehow.

Dave got through two more days of confusion. Bobby and his allergy stayed home from school. But it didn't prevent him from collecting a black eye from a neighbor kid, whose perhaps envious parent had made a remark about Bobby's hero.

"Billy Wall said his Pa said that Uncle Augie is a dope. I licked him."

Yes, this was a mere trifle among the general hullabaloo. For one thing, there was a heated phone conversation with Mrs. Wall, relating to the possibility of whether Billy's rash was "some horrible extraterrestrial plague—very contagious."

Dave Jorgensen wound up by telling the shrieking neighbor woman that he hoped it was all she claimed, so that she wouldn't be disappointed.

And Maxene had a falling-out with sensible Clyde Winters; in favor of the more adventure-conscious Barney Coombs; of course.

Ah, yes—just trifles. David Jorgensen's view of himself was that of a sad and subdued lurker in the background—a sort of unpaid janitor, who picked up after a bunch of mapiacs. All he got was maybe a sympathetic look, now and then,

from Mattie, who, in a much lesser degree, shared his lot.

Dave was still worried about Augie's not mentioning some new solar-system-shaking scheme or project. It was unnatural. And sometimes, in spite of a considerable success as a speaker, with the town-folk of Ridge Falls, he looked downright worried.

It might have been a tip-off, for trouble.

David Jorgensen made contact with first-class trouble on the morning before Christmas Eve. Out in the snow, beside the house, and helicopter, in the exact spot where Augie's trunk had cracked open, he saw two tiny bluish green globes or capsules. Something weird about them made his spine tingle. He took off a mitten. Then he put it back on. It was safer not to touch strange life directly. He pulled at one of the capsules. It came away from the snow, showing a single pulpy root. He squeezed the capsule gently. Its skin was leathery and thick. But the little globe wasn't frozen.

David Jorgensen winced with mental pain, with fright, and with fury. He plucked the second capsule from the snow as if it were a monstrous thing that infected the whole Earth—which might well be the case.

He thought of what everyone had heard about the plant life of Mars: Adapted, by countless ages of evolution, to an extreme climate; possessing thick skin, full of dead-air

cells, as a protection against the nocturnal cold; and generating its own tissue heat, as warm-blooded animals do. Such things could thrive even in a Minnesota winter.

Dave got a tin can from the garage. He put the two tiny alien growths in it. Then he scouted across the windswept front yard. He found a clump of the plants at the edge of a spot of dry grass blown clear of snow. But this was only the beginning—farther on there were more clumps, and isolated growths. Beyond the highway was the whole open field. Dave, working with the same feverish haste with which he might have attacked a fire in his barns, soon had the can full of Martian plants.

The scrape of footsteps behind him caused him to turn about like a startled cat. Sure. It was Augie, grinning down at him.

"The seeds I had sort of got out of hand, when the bottom of my old trunk cracked open, didn't they, Dave?" he chuckled. "I meant better things for them."

David Jorgensen didn't say a word. Circumstances had got to be too much for just talk—even very loud talk. His big fist lashed out like a hammer. Augie didn't move quite fast enough to keep the blow from grazing his cheek. Dave's knuckles left red welts. For a second the set-up looked as though there was going to be one of those special fights—big Viking against big Viking. Dave had topped fifty some years ago; but he was all tough beef and bone.

* Augie's expression was a curious mixture. His pale eyes showed surprise and sadness; then the battle-light flickered in them joyfully. But it was pushed aside with regret, as his massive arms clinched with Dave's. Something amused took its place. Something peace-seeking, and assured. Dave did not, in his fury, see all of these swift and slight transitions; but he sensed some of them, and he saw that final look. It made him feel like a child, or like a cranky old woman, throwing a tantrum.

"Hey-Dave!" Augie half crooned and half chuckled. "Simmer down, will you!"

"Simmer down!" David Jorgensen stormed. "Simmer down when, because of your complete nincompoopish lack of responsibility, I'm in a jam with the whole Department of Agriculture? When it could mean more than fines and jail, with crops all over the world ruined? You don't care if you're wrecking civilization, do you? Don't you know that all Martian plant life is carefully banned on Earth? That growing so fast, and being so hardy, it would become a weed pest the like of which has never been seen before? That it could bring terrible plant diseases? By golly—you've got cheese for brains!"

You had to give Augie Larsen credit—he looked guilty for a moment. Then he brightened. "I know, I know, Dave," he said, "but I'll fix things—somehow. Dopey laws! Well, it's almost Christmas Eve, Dave. It should be nice, for the kids

and Mattie. Can't we let the whole matter drop till the day after tomorrow?"

"In an emergency, you talk like that!" Dave hissed.

Yet his verbal outburst had blunted the edge of his first anger and fright. At least he was no longer urged toward mayhem. Ingrained respect for law and order and the general welfare, did a mighty battle with his natural consideration for the happiness and peace of his family, especially during the holiday season. David Jorgensen was in an anguish of indecision—which added to his crescendoing tribulations.

Just then Mattie, looking worried, appeared at the back door of the house. "Dave!" she scolded. "Why are you shouting?"

Augie stepped on his foot. "Politics, Mattie," Augie said. "Plain old politics. Don't look so doubtful, Mattie."

"All right," Dave growled grimly to his brother-in-law, and in a low tone. "At the risk of my freedom and all I possess, fathead—I'll hold off till midnight. A few dangerous hours, then you and I will drive into Ridge Falls to rout out the county sheriff. This danger has *got* to be reported to the proper authorities, so that measures can be taken against it."

Augie shrugged. "Unwise," he commented. "Still—if I must be incarcerated, I suppose I must, Davy."

So the Jorgensens and friends went to church and then had their

Christmas Eve, with Augie making old music. All was bright with tinsel and good cheer, except for the black load of worry and of ill-will for a certain party, hidden in David Jorgensen's heart. But he presented a new trunk to Augie with a certain sarcastic flourish.

"You may need it to store your stuff in for quite a while, Augie," he said with a wide grin, under which barbs of meaning lurked.

Later, as she handed him a wedge of pie, Maxene paused to hug her father. "Oh, Daddy!" she chirped. "Isn't it a marvelous, special Christmas Eve? Clyde and Barney have figured out our difficulties! Clyde insisted to his father that they might need grocery stores even among the new settlements of the asteroids. So he'll be preparing himself for the next couple of years, to go, too! If there's a triangle, we can figure that out later!"

Bobby, still very red, rolled on the floor and made gleeful hisses to match the manual maneuvers of a toy spaceship.

Then Lloyd, supposedly the sensible son, and still the oldest, approached Dave and said: "Dad—I suppose they will need veterinary surgeons in those colonial places, too. Of course I could take some courses at the university in another direction—rocket theory, for instance; or business administration. I hope I have your blessing for what it must be obvious that I intend eventually to do. Because I am determined."

David Jorgensen wanted to flare up violently against the insidious glamour of exotic mystery and distance that August Larsen had brought into his home, to cause him so much anguish, and now to threaten it with empty ephors. But now he was no longer equal to the effort. Briefly a kind of peace came over him—of exhausted will. Beyond that, he found a little more in the fact that his children seemed so happy. It was like acceptance of defeat. It was a strange calm; and for a while he almost relaxed.

But at eleven-thirty his grim eyes sought Augie's. There was no forgetting the necessity and the hard duty, and the probable trouble for all, which lay just ahead.

Augie shrugged. "Dave and I have got a little errand to do, folks," he said. "Might as well go, now. I guess we'll be back right away."

They drove the short distance to Ridge Falls, the county seat, in a few minutes. The sheriff they found at his home, still up, his family around him. Dave drew the sheriff and Augie to the kitchen.

"Tell him, Augie," Dave ordered. "You remember Augie, Frank."

August Larsen didn't balk for more than a second. Briefly, he seemed to listen to the Christmas program coming from the television set in the living room, while the sheriff shook his head rather diffidently.

"Hello, Frank," he said at last. "I spilled some Martian seeds into the

wind on Dave's farm. They scattered quite a ways, and have sprouted. What do we do? And what's the penalty?"

The sheriff's eyes flickered, now showing a kind of hound-dog eagerness.

"Hm-m-m," he grunted. "Augie, you always were a hot one. So I been lookin' those obscure crimes up in the law books. It's bad. Twenty thousand dollars or a five-year sentence, or both."

David Jorgensen gulped. If there was any paying of that kind of money to be done, in behalf of this improvident relative, he knew that he'd have to do it. And it would take all of his cash.

Augie looked suddenly a bit gaunt. Otherwise, he didn't flinch. In the mounting of his own blood pressure, and desire, again, to do his brother-in-law bodily harm, Dave still got an odd impression from looking at Augie: That here was a big reckless lug with nothing much but his own strength and further recklessness to get him out of a stew; yet, he was still cool, and somehow in command of things. It brought a little sickish sense of injustice and confusion into David Jorgensen's heart. The picture was warped, somewhere. Where did the cautious, thoughtful, considerate guy get his break?

"The law, as it still stands, specifically mentions Hellas Apples, doesn't it, sheriff?" Augie remarked.

"It specifically includes and emphasizes them as being dangerous and forbidden," the sheriff growled.

Augie's heavy blond eyebrows came together like caterpillars kissing. "Ah, the law," he chuckled. "Well, suppose we grubbed all of those young plants out of the snow, and burnt 'em?"

"Quite a job, my boy!" the sheriff stated satanically. "You'd have to get every last one, so there would be no chance of producing more seeds. And there must be plenty, widely scattered. You'd better get going, fella. Or somebody's gonna be unhappy."

"Good night. Merry Christmas, Frank," David Jorgensen said.

"Thanks. Same to you," the sheriff responded. "Guess I'll drive out to your place in an hour or so, though. Got to make out a report on this, for the Department of Agriculture. Besides—to tell the truth—I'm curious about this Martian plant life."

"You need a drink, Dave," August Larsen told David Jorgensen as they left. So, in a minute Dave found himself in a bar, staring rather vaguely at a stiff shot of whisky in his hand.

It was then that Augie took the opportunity to disappear. Dave set his drink down, practically untasted. He searched the lavatory, the phone booths. Anger blazed in him; then it crumpled back weakly, as if it, too, had been overworked. He felt almost like weeping.

Augie was nowhere in the street outside, either. Dave waited five minutes. Then wearily he walked to



his ato, and started for home. There the lights were still on. He could see Clyde Winters and Barney Coombs through the window. So they were still around. But Dave didn't even go into the house. He went to his toolshed, where he procured an electric lantern. He thought of the ancient flashlight which worked marvelously by the energy of the heat from his own hand. Augie's gift, from the science of a dead race. But that it was Augie's gift was enough to make him never want to touch it again.

"Irresponsible, crazy bum of outer space!" he almost whimpered. Still,

some family pride made him loathe to think that Augie had actually ducked out at the crucial moment—like a coward.

He also procured a small can of kerosene—still useful in this era for various cleaning purposes. Then he crossed the road to the snowy, wind-swept field. Might as well see right off, how bad things were. Somebody had to try to fix things, after a fool's trick. Over him had washed a wave of understandable self-pity. Now he had to struggle to protect his property, his bank account, his family honor—and possibly the

whole Earthly industry of agriculture.

He wondered how often steady, plodding men like himself—unnoticed and often despised—had had to pay with toil and blood for the airy casualness of spectacular people, who always had a crowd around them. Yet he knew that his resentment was like envy.

Feverishly he began to uproot tiny blue-green capsules. Soon he had a small pile. He poured kerosene on it, and ignited it. Then he went on gathering more of these infant plants from Mars. He wandered far from the road. He hardly noticed the first car that stopped there, nor the footsteps that came up behind him.

"Hi, Jughead!" a familiar voice greeted.

David Jorgensen wheeled about, unbelieving. "Raisin Face!" he grated.

George Munz snickered at him, his withered features derisive. It was as if he were enjoying the shock of his utterly unreasonable presence on his old ribbing mate. Then he laughed.

"Jughead," he said, "when someone comes to my house when I'm about to hit the hay, and invites me at one o'clock on Christmas morning to a hunt for Martian Hellas Apples out in the snow, and then drags what he says is a Hellas Apple plant out of his pocket, I get curious. I figure he's got something more than you got, Jughead. Maybe just a less dull type of stupidity."

A slow, aching pang of compre-

hension spread through David Jorgensen's brain. His soul, in its time of indignity, as he struggled to repair the effects of another's callous blunders, felt naked and shamed before his enemy.

"My brother-in-law!" he said. And no profane adjectives could have added one iota to the bitterness and loathing expressed by his tone. "What'll he do next? Get out of here, Raisin Face! Leave me alone! Just leave me alone—"

Munz just laughed again. "Uh-huh," he taunted. "Your Augie sort of suggested that you were feeling very low, Jughead—that you were an object of pity, and that it was about time to stop pulling your leg about the price for those hundred acres. Of course he didn't say right out that you were so bad off at all. But I got the impression that you were on the verge of suicide. O.K., Jughead—don't say I'm not charitable. You've cried hard enough. You can have the land for twenty thousand."

This kind of joshing seemed about to throw David Jorgensen into the mad-dog stage. He wasn't the weeping skinflint that Munz was trying to make him out! He wasn't! He wanted to scream that he wasn't. But then a small spark of cornered-rat psychology, came to his aid, reminding him that ribbing was a game, like chess—that you had to try to turn the tables on your opponent. As soon as he remembered all this, his wits came back, and he felt a lot better.

"Changed my mind, Raisin Face,"

he growled. "Don't want your stony burdock patch for any price. Thanks though for coming out in the middle of the night to help me weed my snow. Neighborly of you. So let's see you work. By the way, where did you leave Augie?"

Munz looked startled and chagrined for a second. Then he forced a weak chuckle. "Oh—now you think you're smart," he drawled. "Even your brother-in-law is a hundred times as bright as you. I dropped him at the house—to get some help."

David Jorgensen heard their voices, now. Maxene's mingling with Lloyd's and Clyde's and Barney's.

"Martian plants! Holy cow—"

"Growing in winter—"

"Lead us to them, Uncle Augie. Oh—there's Pa!"

David Jorgensen's relief at receiving help, and at knowing that Augie hadn't ducked out on duty, was tempered by the thought that the prodigal knew how to make a lark out of a dirty job. When, to his own mind, such an idea had never come. To Dave, it was like a successful thrust at his own standards and philosophies. It puzzled him. It made him feel, in another way, frustrated and defeated.

Still, there was a threat from space, posed by these alien plants or weeds, that had to be crushed out quickly. It could be grim. There was no joking about that. Or about fines and jail sentences. The hours were long. The night wind was cold—in spite of a bonfire, and kidding and joshing, and Maxene's and Munz's

going back to the house to bring refreshments, and the sheriff's arrival to watch, ending up with his giving a hand with the strange toil. A number of other people came out from Ridge Falls to help, too—on the tip-off that the sheriff had left behind with his family.

Toward five a.m., a television truck arrived from the city. That was something special to be in on, wasn't it? But even then Augie had pensive moments of seriousness, showing through his easy grin. And he worked doggedly, searching out and uprooting as many of the widely scattered growths from the oasis of Hellas on Mars, as anyone else, Dave noticed. Yet somehow it didn't give him as much of the satisfaction of a victory over a prodigal as it should have.

At six a.m., Augie gave a rueful sigh of relief, mixed with big-man's humor, and said: "I guess that does it. About the last of the 'invaders' is burned up, eh, Dave? Thanks, everybody. I figure I could manage to give each of you a hundred bucks apiece."

"Oh, no—we wouldn't hear of it, Uncle Augie!" Maxene, who was now the picture of bedraggled exhaustion, gasped instantly.

"Nuts, we had fun!" Barney Coombs chimed in.

"We'll remember tonight as long as we live!" Clyde Winters added.

The only odd note was contributed by Lloyd Jorgensen. It would have been a statement worthy of George Munz. But the latter character had been defeated by time, and unaccus-

tomed toil, and was now asleep in his ato.

"I admit that tonight has been a wonderful experience, a foretaste of contact with other worlds, Uncle Augie," Lloyd pronounced very earnestly. "Still, I could use that hundred dollars."

"Pay up, Larsen!" the sheriff laughed.

David Jorgensen was satanically proud of his son.

That Christmas day turned out to be a very sleepy one for the Jorgensens. Otherwise, it wasn't too bad, except for a faint uneasiness on Dave's part. The dustlike seeds were a little too heavy to have blown really far. Yet he knew that somebody would have to go daily around his farm, for quite a while, yet, to explore for possible Martian plants that had been missed.

He was also troubled by a vague conviction that, in spite of his material success, he'd missed a lot in life, and that it was too late to do anything about it.

Somehow the land that he could have had from Munz at his own price, didn't seem worth the bother, now. Another strange thing that happened was that when he got up for supper, Augie paid him back a thousand dollar loan of years standing—and with interest.

Dave knew that he probably didn't have much left. Yet Augie settled up so casually that it somehow made him feel overfed and greedy, though he was sure that he didn't deserve such a description. Even without the

accusation in Mattie's eyes, he probably would have wanted to give the money back.

"I'm twenty-eight," Augie laughed. "Time I steadied up, Dave."

"I guess you'll be getting married out there, Augie," Dave said, "to your Rose Mahoney. You take this dough back, Augie."

But then Mattie did another feminine switch. "Oh, no, Mr. Santa!" she warned. "Half is plenty!"

An hour later there was a visiphone call from Minneapolis. Television wanted August Larsen to deliver some talks about other worlds. And, yes—would the Jorgensens, on whose farm the Martian seeds had been spread, make one more appearance?"

Augie left for the asteroids in a little over a month. With a wave and a grin he went out beyond the sky, to the region of bigger tomorrows, from which he had emerged.

But long before that, a lonely, discarded feeling had come over David Jorgensen. Maxene still lived at home while she completed her final months at high school, but her thoughts were far away. And who could change that, after all? Bobby's Martian rash faded, but only his body seemed on Earth. Lloyd was back at the university, his plans reaching out toward the stars. The infection that Augie had brought, was deeper than an allergy, and far older than space travel. Dave had given up. How could you fight a thing like that? Dave remained rest-

less, glum, and unsure of his values. Sometimes he even dared to wonder if he *had* to stay behind.

Daily he explored his farm for strange growths, for the law still hung over him—and the dangers it was meant to guard against. Department of Agriculture inspectors still came to see him. A few times he ripped horny, gray-green things out of the frozen ground, and burned them to ashes, sighing with relief as if he had killed a deadly enemy. But the day came when he was sure that the taint was stamped out. It made him feel rather strange.

Maybe that was why, when in early February he went into his woods again, the goose pimples that rose on his flesh at what he saw in a place which he must have missed before, did not smooth out so soon. For a strange thrill had come into his blood, a kind of defiance, and a hope. Already he had been to the Ridge Falls library, reading books and scientific reports—searching. He didn't like the idea of breaking the law. More important, he knew that he had to be careful and responsible, while messing around with a danger that might affect farmers everywhere on Earth. Yet he'd found a dream and an adventure. And now, instead of hurrying for his blowtorch, he made his way back through the woods, and without even changing his clothes, hastened to town and the library again.

When he came back, he said to his wife: "Mattie . . . this afternoon . . .

right now . . . I want you to take a walk with me."

"You look and sound like murder, you old stick in the mud," she laughed quizzically.

"Some people might have called it worse," he replied.

Minutes later, deep in the woods, they stood before a hard-skinned, gray-green monster with pulpy leaves. It was ugly, yet in a way, beautiful. With his pocketknife David Jorgensen cut down one of the dozens of warty capsules that hung from it, and sawed through its hard shell, splitting it in halves. One of these he passed to his wife and, without a word, he bit into the cool pinkish meat of the other. Unlike the sub-zero air, its temperature was above freezing. It was sweet, but there was a very special tang to it. A tang from Mars—from the far, intriguing distance.

Yet there was another, stronger sensation in David Jorgensen's nerves. Thrilling. Alive. Something which gave him what Augie Larsen had. Something which restored a spark in himself, and took away the restlessness.

"Go ahead, Mattie—taste it," he urged. "It's good! These are Hellas Apples. On Mars the colonists eat 'em all the time. They could become popular, here."

Mattie looked very scared. "But . . . good night, Dave!" she quavered. "We've got to burn this thing down—or its seeds will spread its kind all over the country—and choke other plants out!"

Dave shook his head. "It seems not, Mattie," he told her. "Tests have been in progress for a long time—on Mars. The equivalent of an Earthly spring and summer climate—duplicated in laboratories—are against these Hellas Apple plants. Too warm and humid for too long. Besides, terrestrial soil bacteria, too active from April to October, would destroy them down to the last seed and root. This much has been proven—to have a basis on which to change a law. And now it has just been changed, Mattie. Augie must have known it might be changed, as, for a while, I've hoped it would be, too. Other, even tougher Martian growths remain on the danger list. But Hellas Apples may now be grown on Earth!"

Mattie eyed her husband with startled admiration. "Say—!" she exclaimed. "You old mossback! You aren't considering planting those seed still in Augie's discarded trunk,

and raising a crop of this superfruit next winter, are you Dave? Get in on the ground floor with the swank restaurants?"

He grinned. "Those seeds aren't in the trunk any more," he said. "Every last one of them is safe in an air-tight bottle. And with most of February and half of March ahead, why wait for next winter?"

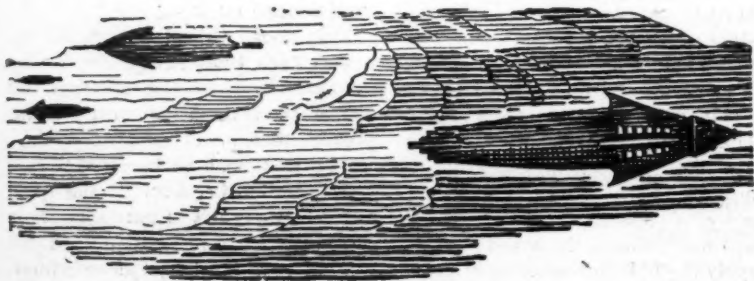
Mattie's eyes widened. She's always known that she had a good man—steady, but full of quiet fire, too.

"Uh-huh," she commented knowingly. "You fool. I guess you don't envy Augie any more now, though, do you? Having our piece of the far sky, with a little of the planets in it, is kind of nice at that. And not being left out of Tomorrow."

David Jorgensen chuckled deep in his barrel chest.

"According to an old story, Mattie," he said, "you'd still be rated as a little slow—for a woman. Tasting that apple, I mean."

THE END



BOOK REVIEWS

"The Flying Saucer," by Bernard Newman. Macmillan Company, New York. 1950. 250 pp. \$2.50

The canny publishers of "Forever Amber" have no such mother-lode in this venture into science fiction, and it is their own fault. They have picked up what is apparently one of a series of typically British "thrillers" featuring a grown-up Tom Swift by the name of Drummond—who has previously whipped up the atomic bomb—a music-hall French detective, Papa Pontivy, who has likewise starred in some of Mr. Newman's other sixty books, and some low-comedy F.B.I. men with strong British accents.

The plot is the one tried a few weeks earlier in "The Big Eye"—a hoax plotted by leading scientists to unite the world against a common enemy, in this case fictitious Martians who demand the world's entire supply of gold. In a mixture of Jules Verne and early E. Phillips Oppen-

heim, we are treated to the added complications of Soviet suspicion, an intriguing armaments king, a beautiful spy, and assorted Zetetics. Before Drummond is through he has produced a protonic bomb, a variety of rockets, and a few mangled Martians. It is all corn of the corniest, but oddly enough it has a kind of fascination about it, nostalgic of the yarns which enthralled us a generation ago.

P. Schuyler Miller

"The House That Stood Still," by A. E. van Vogt. Greenberg, Publisher, New York. 1950. \$2.50

The sixty thousand words comprising this novel constitute Van Vogt's first book to be written expressly for hard covers. "House" departs considerably from what has gone before. It is essentially a mystery story, what Ellery Queen is fond of terming 'tec fiction, with some

scientifictional trimmings and trappings such as the process of de-differentiation and artificial element #167. Taking place in Earth's near future, there are murders and machinations revolving around the mysterious Grand House and the menacing band of immortals who were created by a robot-controlled spaceship from the stars twenty centuries ago. Amongst these immortals is one mind reader, and Mistra Lanett, a beauty at variance with the policy of a beastly acting bunch of supermen. There is a grand finale in the 'tec tradition, with all suspects assembled for a war of nerves while Allison Stephens, the mortal protagonist, deduces who is the guilty party. I was surprised.

Weaver Wright

"Farmer In The Sky," by Robert A. Heinlein. Charles Scribner's Sons, New York. 1950. 216 pp. Ill. \$2.50

It should be no news that Robert Heinlein's series of Scribner juveniles rank well up with some of the allegedly adult science fiction novels appearing currently. The "farmers in the sky" of his title are colonists on Ganymede, which frigid satellite of Jupiter has been given a barely bearable climate to serve as an overflow reservoir for a cruelly crowded Earth. The minute attention to detail which was so striking in Heinlein's film, "Destination Moon," has never been more fascinatingly shown than in this description of the re-

making of a world of dead rock and ice into a granary for mankind. Struggling with bureaucratic bungling, political pressure, and a tidal disaster, his Boy Scout hero, Bill Lerner, slowly hardens into the kind of young pioneer whose resilience and adaptability has always made frontiers possible. Unreservedly recommended — unless you insist on heroes older than you are.

P. Schuyler Miller

"Conan The Conqueror," by Robert E. Howard. New York: Gnome Press, 1950, 255 pp., \$2.75

This is a welcome addition to that limited group of novels of high romantic adventure laid in an imaginary setting. The setting may be called the planet Mercury — as in Eddison's "Worm Ouroboros" — or medieval Spain — as in Dunsany's "Don Rodriguez" — or the prehistoric world as in this novel, but the settings have little or nothing to do with the real times and places denoted by these names.

Howard was an almost-very-good writer who might have overcome certain limiting quirks had he not killed himself at an early age. Conan exhibits his virtues of fast and uproarious action, and of the maintenance of a high level of tension — a quality exemplified among current sf writers by Leigh Brackett. His main fault was a tendency carelessly to throw his imaginary world together

anyhow, so that the poor carpentry shows.

Nevertheless Howard buckles a good swash. The story's speed, force, and zest carry it off. If not so good as the best in the genre like Eddison's "Mistress of Mistresses" and Fletcher's "Well of the Unicorn," it stands well above the Martian and Venusian tales of Burroughs and Kline, which belong to the same class and are not without their virtues.

The tale tells of the overthrow of the mighty Conan, king of prehistoric Aquilonia, by Xaltotun, a wizard of even more ancient Acheron revived from the tomb by sorcery, and Conan's climb back to power with the help of the magical jewel, the Heart of Ahriman. Dr. John D. Clark, longtime fan and sometime sf writer, who is editing Gnome's whole series of Howard books, contributes a lively introduction. A must for those who—like your reviewer—revel in a sanguinary combination of sorcery, skulduggery, and swordplay.

L. Sprague de Camp

"Science Is A Sacred Cow," by Anthony Standen. New York: Dutton, 1950, 221 pp., \$2.75

I once knew a man who, though witty and intellectual, became such a snob that nothing ever pleased him. I finally stopped socializing with him, learning that a continuous sneer can become as tiresome as a perpetual

gush of enthusiasm. Standen's book reminds me of this man.

Mr. Standen, an Anglo-American chemist, has undertaken to debunk the exaggerated claims of scientists for the virtues of science. It is true, as he asserts, that some scientists—like other folk—are sometimes pompous or unscientifically dogmatic; that they make foolish pronouncements in fields wherein they are ignorant; that they pretend that science can be substituted for the other pleasures of life; that they try to apply scientific methods in fields wherein they are meaningless; that they make unnecessary use of professional gobbledegook in speech and writing; and that they would be better scientists and more attractive people if they avoided these faults.

Some scientists, sometimes. All this can be said briefly, but to produce a whole book Standen has indulged in vast repetition, exaggeration, and use of derisive, question-begging, and emotionally loaded but meaningless terms like "the science-mongers" and "the higher bunkum." It's mildly amusing until, like my sneering friend, it gets tiresome. What is the man driving at?

He rates mathematics as the only "true" science; physics as the "best" science because of its exactitude; biology as a semiscience, and as for the inexact sciences like psychology and sociology, they are not sciences at all. When the reader at last thinks Standen is going to explain what he believes should be or should be done, he simply avers, as dogmatically as

any "high priest of science," that "The first purpose of science is to learn about God, and admire Him, through His handiwork." And without giving you the slightest reason for accepting this statement or for believing that God exists. Elsewhere he talks similarly about the soul; what soul? And: "Even an indifferent theologian is better than a modern scientist." At least no scientist has yet burned anybody for refusing to believe the Earth round.

It was a good idea, at that. Too bad.

L. Sprague de Camp

"The Dreaming Jewels," by Theodore Sturgeon. Greenberg, New York. 1950. 217 pp. \$2.50

The one short story collection we have had from Ted Sturgeon, "Without Sorcery" — Prime Press, 1948 — and the stories picked up for anthologies have been an utterly inadequate representation of one of the finest writers in the science-fantasy field. Now a new series of science-fiction novels, the Corwin series, has been launched by a brand-new and completely fascinating book. Its hero, Horty Bluett, is a boy who ate ants, who could grow new fingers, who lived for years as a midget under the protection of the tiny beauty, Zena, and who was strangely linked to the fate of the two gemlike eyes of a crude wooden Punchinello. Pierre Monetre, "the Man-eater," master of

the carnival troupe where Horty found refuge from a brutal foster father, had devoted a lifetime to the study of the jewels from outer space whose dream-fantasies solidified into flowers, trees, men, and the half-men we call freaks. These three, with the "strange people" of the carnival, Horty's childhood sweetheart, and his foster father, Judge Bluett, play out the drama of Monetre's efforts to control the dreaming jewels and convert their dreams into nightmares for the crippling of a mankind he hates. "The Dreaming Jewels" is recommended as much for its people and the way it is written as for the ramifications of the plot.

P. Schuyler Miller

"Time, Knowledge, and the Nebulae," by Martin Johnson. Dover Publications, New York, 1947; 189 pp.; indexed. \$2.75

Up to early in 1945, our theory and understanding of relativity was limited by a large—if esoteric—omission: a failure to deal in any satisfactory way with the problem of simultaneity. Einstein had already shown that the problem apparently did not come up in astrophysics, because the limitation of the speed of light and other radiation to 186,000 miles per second ruled it out, in a very practical way; whereas, for most local event-systems, the old Newtonian time seemed to work well enough.

Most relativists were content to let it go at that. The problem of what events might be said to be simultaneous, and for that matter the far larger problem of just exactly what, in physics, might be meant by "simultaneous," had not been formulated at all.

This might seem to be of interest only to the semanticist, but, like most terms in relativity, our entire concept of the structure of the universe hangs from how one defines that one word. Even the failure to define it in the Einsteinian and other relativities was a tacit definition with far-reaching theoretical consequences.

In 1935, the late Professor E. A. Milne, who was president of the Royal Astronomical Society, published the first of a series of speculations on the nature and kinds of Time in relativity theory; a series which led eventually to the now-famous Milne cosmology, published ten years later. Milne was a brilliant thinker and mathematician but a somewhat disorderly one; and the piecemeal fashion in which he presented his work, and the intuitive skips in both his logic and his math, left him open to attack from more methodical scientists.

Milne replied with such asperity that the controversy soon became quite bitter, on both sides. Milne was revising a huge block of the Einstein-Lemaître universe, and intruding several radically new concepts, concepts so basic as to seem like the sheerest "philosophizing" even to men who were able to swallow the

notion of an expanding universe shaped like a four-dimensional soap bubble.

As a matter of fact, however, the question is philosophical in part, as Dr. Johnson makes clear in the scholarly and equable volume named above now available in this country. Now that the dust has begun to settle, it is becoming clear that Milne's relativity is a solid, substantial contribution of enormous importance—easily the most important work done in relativity since Einstein's first contributions.

To give but a single example of the far-reaching implications of Milne's theory: In Milne relativity, the famous "red shift" in the spectra of distant galaxies is *not* a Doppler effect; thus the distant galaxies cannot be considered to be rushing away from us and from each other at enormous speeds, as Lemaître, with Einstein's approval, has postulated; and, consequently, the universe may well be infinite as well as unbounded, the concept of the fourth dimension may be nothing more than an epistemological convenience, and there is no evidence whatsoever that the universe is expanding—

Why all this should follow is beyond the scope of a book review. Dr. Johnson explains it, and other matters of the same kind, in "Time, Knowledge, and the Nebulae." Johnson's book is not a complete account of Milne's theory, but only of the most crucial part of it—the problem of Time—and a few of the consequent implications. As indicated

above, it is this problem which is most important in modern relativity theory, and some of the more immediately spectacular ideas Milne has offered, such as the cosmology, derive directly from his handling of Time.

Dr. Johnson's book could not honestly be described as a "popular," or Milne-for-Morons, account of the theory; it is of about the same order of difficulty as "Cybernetics." It resembles Norbert Wiener's book also in organization, as well as in readability. It is divided into three sections, the second of which is aimed solely at readers who have the mathematics required, the outside two to the intelligent layman.

The mathematical section consists of a summary of relativistic approaches to Time, from Lorenz to Milne. This section boils down some of the most difficult thinking of the past sixty years in brilliant fashion. No demonstration is included; the section is strictly expository, quoting all the essential formulae, but seldom showing their derivations. (True also of "Cybernetics," for the most part.)

The outside sections of the book also include some math, but little of it is difficult. The discussion in words concerns itself, most lucidly, with "the meanings of Time in physics, astronomy, and philosophy, and the relativities of Einstein and Milne."

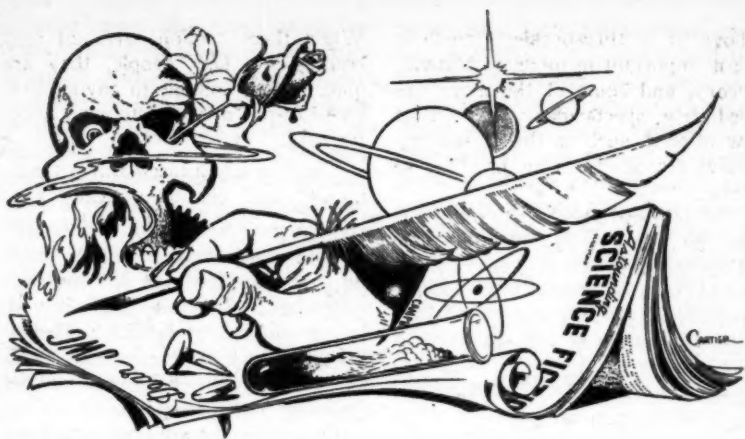
While these sections are not easy reading for lazy people, they are quite understandable to anyone prepared to pay attention to what is being said.

There is also a fascinating, illuminating, and characteristically cantankerous foreword, by Milne himself, dealing mostly with what Milne means by a "clock"; an appendix defining the physical concepts used in the book; another appendix analyzing special problems of spiral nebulae in the Milne scholium; and an excellent bibliography.

The Milne cosmology and the more general principles from which Milne derived it will be cropping up with increasing frequency in science-fiction stories in the future, just as Einsteinian relativity did. Science-fiction readers who hope to follow such stories—and who hope to guard themselves against swallowing such hopeless misconceptions of the material as those which were once foisted upon them under the good name of Einstein—will do well to give this small and fascinating tome a serious reading.

I would like to suggest, also, that every writer of science fiction put "Time, Knowledge and the Nebulae" upon his *must* list—if only to avoid committing new howlers under the good name of Milne.

James Blish



BRASS TACKS

Dear Mr. Campbell:

The much-looked-forward-to "Destination Moon" has at this writing played most of the neighborhood theaters in Chicago. What success it met with I haven't seen publicized; personally I hope it brought a good return.

Asking around of some nontechnical people who saw it and had no previous contact with such heavy concentrations of science fiction and rocket engineering I found it to be regarded as interesting at best. Others confronted with the technical details were either confused or brought to argument. Some were disappointed with its not being the usual fare: a technical adventure story.

A woman reviewer in one of the Chicago papers rated it as suitable for twelve-year-olds, basing her criticism on the injection of one of the most obvious Hollywood plots. Yet she unwittingly admitted her judgment was not completely severed from present-day Hollywood standards of entertainment when she overlooked all the documentary excellence and cutely remarked that the only good part was the Woody Woodpecker sequence explaining the principles of propulsion.

In a way she was right. But then Robert Heinlein warned us. This wasn't meant to be a slice-of-life in a spaceship. Its great significance lies in its presentation of situations you can only read about then try to

visualize—which is pretty hard for an Earth-accustomed set of senses.

It seems to me space travel would certainly demand an extreme degree of perceptual adjustment. It is more than mere motion that's disturbing. You don't become seasick because the ship rolls. It's because your eyes see only the frame of reference of a compartment which to the eyes is always level, while your semicircular canals are reporting an entirely different situation as the deck tips. Some bad cases of seasickness clear up as soon as the victim can watch the horizon.

The painstaking observance to the details of interplanetary nongravitational phenomena that the movie revealed becomes more thought-provoking in retrospect. Particularly upon rereading Heinlein's article. I wonder how many perceived the characters finishing their drinks in one scene in sealed flasks through straws. The most amazing comment of all I heard was made by a graduate chemist about the opening shot of the picture showing the initial seconds of a rocket take-off. He was unaware that these were actual White Sands Army films and thought he was watching a mock-up. He stated he felt it was corny having the rocket take off that slow!

The part though that really got me thinking since I ran the picture through my mind was the shot of the cast first stepping out into space through the air lock onto the hull of the ship. They spent an uncomfortable few minutes upside down mar-

veling at the black space around them, then proceeded to walk around the hull to the opposite side. Plagued by the memory of that simple act I have been trying to put myself in their magnetic shoes and visualize the effect of walking around the cylinder of the ship in space. Down would always be toward my feet and I would not be aware of myself walking to an upside down position any more than I would by traveling to the opposite side of the Earth. Therefore it would appear to me as I stepped that the whole mass of the spaceship were turning and not I, much as the log appears to a log-rolling lumberman standing on one in the water. But contradicting this impression is the movement, in relation to myself, of the stars. Could my senses be fooled even further into believing I alone stood still while the universe wheeled?—William Vietinghoff, Berwyn, Illinois.

In other words, how egocentric would a man get?

Dear Mr. Campbell:

It is no surprise to me that J. S. Horan, M. D., of Pendleton Place, Memphis, Tennessee, is "very much confused" by the article on Dianetics. At the start of the First World War, I was working in the business office of the old San Francisco *Chronicle* at the intersection of Market, Kearney, and Geary Streets. At that time we were running test advertising,

selling Bibles and dictionaries, to check the pulling power of the paper. Our advertising copy was quite clear and definite. Yet there was a certain percentage of readers coming in to complain that we had made such and such claims about the goods we were offering for sale, complaints which they could not substantiate when I laid a copy of our paper before them. A handful of years later, while writing copy in an advertising office in Portland, Oregon, I described a certain "straddlebug" lumber carrier as being able to operate smoothly and efficiently "for days on end." The manufacturer of the machine made me strike out the phrase "for days on end" because he was sure the reader would think the machine would stand on end while operating.

Apparently in his study of psychiatry, Dr. Horan has acquired certain very fixed ideas which block any effort to understand a new approach. The confusion is not in Ron Hubbard's article but in Dr. Horan's head. He says he is not planning to buy the book because he fears it will be as confused as the article.

This is the peculiar attitude taken by the fanatical members of certain religious groups, who will not learn anything about the world they live in because it contradicts what they imagine the Bible says.

Heaven help the patients of medicos who have such rigidity of brain. One of my boys, a veteran of the Second World War, wounded in action but later recovered and accepted

by the army for a second enlistment, was sent to a military hospital. In the hospital recreation hall, he found considerable pleasure in playing old-fashioned tunes on the phonograph. As a child at home, he had developed a taste for such music and had not learned to like the dissonant, nerve-wracking boiler-factory stuff currently passing for music. Immediately the psychiatrists hopped on him for being abnormal — *because he did not conform to the norm for his age-group!*

So they shot him full of drugs and gave him electric shocks and did everything else they could to wreck his brain. He finally refused to take the drugs and rigged up a little gadget—in private—by which he accustomed himself to take high voltages of electricity. When the shocks given by the psychiatrists failed to stun him into insensibility, the psychiatrists themselves nearly went nuts. Some of the weird antics pulled on patients under military discipline make me devoutly thankful we do not have socialized medicine. Thank God they never got around to curdling his brains with a wire prong. Instead they gave him a 369 discharge and sent him home.

Some of his buddies did go nuts from those "recognized *effective* treatments," as Dr. Horan so naively terms them, and were locked up in the prison ward.

In case Dr. Horan is too "confused" to see any relevance in my opening paragraph, let me point out that even simply-worded advertising

can be misconstrued by a reader who persists in interposing fixed mental images between his eyes and the printed page. Mr. Hubbard distinctly warned that he would have to toss out a lot of terminology so dear to the heart of the professional psychiatrist, because such terms did not convey the ideas he had to convey.—Russell H. Clark, Box 3, Harrisburg, Oregon.

To quote Authority: "By their fruits ye shall know them."

Dear John:

Your "policy" of favoring one-word titles, titles with a punch, titles which take on double meanings once the story has been read, has belatedly borne fruit in the form of this letter.

I have been bowled over by a big idea. The above, PLUS the November 1949 issue with its several so-obviously-written-around-a-title stories, together suggested the general concept of, instead of trying to add up new and old plot elements into a story, rather pulling a title out of a hat and trying to concoct a plot to fit. And it works!

Hear yet further: The one-word titles are the payoff. What's a more natural place to seek them than the abridged dictionary? Egad! A few minutes' thumbing should convince the most hardened author that a wealth of material lies behind the innocent black-and-white of — get this — OVER fifty percent of the

nouns to be encountered therein. In looking over the block A to AB (!!!) I pulled out about TWENTY possibilities. Want a list? Why bother — you can convince yourself!

Let's just consider this letter, which was NOT written with that idea in mind. How about these as titles:

POLICY: Plentary isolationism? Galactic government? Future life insurance which actually insures your life? ("Suburban Frontiers").

TITLE: Life as an animated literary work, perhaps—with the title of the work as a punch-line. And how about "PUNCH LINE"??

DOUBLE MEANING: . . . Oh, a wealth of possibilities!

FRUITION: Some cosmic plan which is Even Now coming to a head—?

Maybe these examples, unselected as they are, aren't so hot. But, man, look at the number of possibilities! Think of the superb stories that might be written to titles of such cosmic scope as "IMPRINT"; "CONFLAGRATION"; "FACADE"; "MILLENNIUM." (Of course, none of them will suggest the same plot to any two people. Say, how about a contest in which we're invited to write 'em? Might inspire some of that hidden talent! And you could print more than one winner, since we'd know the reason for the title-duplication.) But, however you do it—let's see some of those stories!—Azriel Rosenfeld, 475

West 186th Street, New York 33,
N. Y.

There is no need for a special contest; each issue of the magazine is the result of a wide-open, year-round contest!

My dear Mr. Campbell:

Your issue for November 1950, which I have just received, I would classify as about average for Astounding Science Fiction. I rate it as sixth in order of the last twelve issues, with top billing going to the February issue and second to the March. I classify the July and January issues as a photofinish tie for third place. Such rankings are based on an analysis of rank orders of each type of article published with the issue ranking weighted by the amount of space devoted to each publication.

As to the November issue, my ranking would be as follows:

1. "Quixote and the Windmill." I classify this ninth of the thirty-two short stories published in the last twelve issues. My three top listings remain "The Inspector's Teeth" in April; "Skin Deep" in July; and "The Perfect Weapon" in February. I seem to like Mr. Anderson's style, you note that number three is his, as well as the current number nine. As to the current story, it is a very nice example of the hidden punch, with the ending putting a new addition to the problem of tech-

nological unemployment which is the story.

2. "In Value Deceived." I call this eleven out of thirty-two. This series has been consistently amusing from the beginning. Here again the surprise ending is well handled, and makes a very valid point in interterrestrial socio-economics.

3. "Tools of the Trade." I rank this seventh of the twenty novellettes in the last year. Up to the end I would have given this a lower ranking, and I still do not think the previous "Regulations Provide" a very good story. It is awfully easy to make the "Bureaucrat" a whipping boy, even easier than doing the same to the physicist because he developed atomic fission. I object, possibly because I have been a bureaucrat myself for a good long time. Because I have been on the inside, I can cite more horrible examples than any outsider, but I can see the problems of the alleged bureaucrat who has to administer a program and must step on some toes in the process. All I got out of "Regulations Provide" was the idea that government agents are stinkers. In the current story Mr. Jones at least admits that it is possible to have a competent man in an administrative post, even if he had to go to Radal to find one. So, I'll boost the estimate, and call this an above average novelette. My top rankings for the past twelve months would be: "New Foundations" in March; "The Helping Hand" in May; and "The Little Black Bag" in July.

4. "Science for Art's Sake." Actually I rate this as a tie for fourth place with the following short story. I place the article first simply to point out that I believe under my system of ranking articles vs. articles, and short stories vs. short stories, et cetera over a twelve-month span that it is possible to rate articles with fiction and also to provide some historical basis for the rating. This article I rank sixth of sixteen. Frankly, as a person with a very vague musical ear, the ranking is really a reflection of the ranking I would have given to the previous "Chance Remarks," if I had not been too lazy to start this system early enough to have covered the original article. The musical parallel was beyond me. I would like to add that if your editorial comment had been a part of the article I would have probably pushed the ranking up a space or so. My top rankings still remain: "Shooting 'Destination Moon'" in July; "Science and Truth" in December '49; and "Why Do They Do It?" in September.

5. "Follower." I rank this twelfth of thirty-two. It was better than average, but the surprise ending was not so well concealed as in the other short stories.

6. "The Truth About Cushgar." This one I rank ninth in twenty. It was a nice bit of space opera. Until I went back and checked on it in the course of writing this letter, I thought that the present heroine was the same as the secondary character in the previous "Agent of Vega"

of July 1949. But no, that was Agent Pagadan, who comes in this time as one of the marines, and this is Agent Zamm. I really don't know why, it would have made no difference in the story as a separate entity, and would have tied the two together better in case someone wanted to offer him a book contract.

7. "The General Adaptation Syndrome." This I rank eleventh of sixteen, and rather regret not giving a higher rank. It is an interesting article, with a very well done beginning and end, but Dr. Winter was not able to carry me through the middle without a fair degree of effort on my part, even though I was interested in his subject. Please don't fire him, he has a lot of good stuff, but I believe he needs more coaching in writing technique.

In conclusion, is it in any way possible to speed up the book reviews? I am a long, long ways from any bookstore that carries science fiction. My pocketbook will not allow me to issue a standing order to a bookseller for all science fiction publications, and yet I would like to buy the outstanding ones. The outstanding example of delay in review in the current issue may be due to modesty on your part, but nevertheless, if you are going to review "The Mightiest Machine," why wait two years after publication to do so?—J. Nixon Hadley, Tokyo, Japan.

Sorry on that delay—we're trying to catch up, but they come out so fast now!

PROBABILITIES AND PUNCTURES

BY MILTON A. ROTHMAN

The problem of meteors in space is evidently important; the question is: Is it pressing?

Further proof that science is catching up with science fiction appears in the October, 1948, issue of the *Journal of Applied Physics*, where there appears a paper by G. Grimminger entitled: "Probability that a meteorite will hit or penetrate a body situated in the vicinity of the Earth."

In other words, if you have a spaceship circling the Earth in an orbit, what is the probability that in a given length of time it is going to be hit by a meteorite large enough to penetrate its shell?

A calculation like this, of course, is just a step higher than a wild guess, because it involves the use of quantities which we have no way of observing directly. For example: what is the number of meteorites of 0.001 cm. diameter entering Earth's atmosphere each day?

It is estimated that this number is 45×10^{12} , but this can only be a

very uncertain quantity.

Furthermore, how can we calculate the penetration of a particle through a metal plate at velocities in the neighborhood of ten miles per second? In the past it has been assumed by science-fiction writers that any meteorite, no matter how small, would be able to penetrate, due to its great inertia. The present calculations, however, indicate that the effect of very small meteorites would be not so drastic, while larger ones would be so scarce that the chances of encountering one would be very low.

Grimminger has made his calculations on the assumption that the particle would penetrate as though the metal were perfectly deformable, like a fluid, and so the problem could be treated by methods used in aerodynamics. The results indicate that the penetration is proportional to the

density and diameter of the meteorite, and to the logarithm of its velocity.

A typical result is as follows: for a spherical meteorite of specific gravity 3.4, hitting a stainless steel plate with a velocity of about fifty miles per second, the penetration will depend upon the diameter of the meteorite according to this table:

| Meteorite diameter | Depth of penetration |
|--------------------|----------------------|
| 0.3 in. | 1 in. |
| 0.03 in. | 0.1 in. |
| 0.003 in. | 0.01 in. |

These depths of penetration are certainly much less than those expected by science-fiction writers, and less than one would expect intuitively. At these high velocities the depth of penetration depends very little upon the actual velocity of the meteorite—in other words, doubling the velocity will hardly change the distance penetrated into the metal plate. However, this distance is directly proportional to the density of the meteorite, so the penetration for a pure iron meteorite would be twice as much as given above, while it would be slightly greater for copper.

It is now necessary to determine the probability for a spaceship being hit by a meteorite of a given size. Knowing the thickness of the ship's skin, we can determine the chances of getting along without becoming

punctured. This calculation was made for a ship circling Earth in an orbit at a height of three hundred miles.

For a ship with an exposed area of one thousand square feet, we can make a table showing the average number of hours between hits (N) for a given size of meteorite.

| N | Size |
|------------------------|----------|
| 4×10^9 hrs. | 0.3 in. |
| 1.5×10^5 hrs. | 0.1 in. |
| 2×10^4 hrs. | 0.01 in. |

Thus, for a ship with a skin thickness of at least one inch, you could circle about Earth for about one million hours with a thousand-to-one chance of *not* being punctured by a meteorite. For a thickness of 1/10 inch, this one thousand-to-one time comes down to the neighborhood of one thousand hours, which is beginning to become dangerous.

As far as the armor plate is concerned, the depth of penetration depends mainly upon the density of the plate, and somewhat upon its ultimate tensile strength. It would have to be decided whether it would be more economical to use a thin, very heavy metal, or a thicker but lighter plate.

At any rate, it seems that one-inch steel armor plate would make a fairly safe spaceship, which should be reassuring to all the authors who have been going ahead blithely by ignoring the meteorites.

THE END

WANTED—HELP!

BY R. S. RICHARDSON

*An article which is essentially a report on
the results of an article of ten years ago!*

Ten years ago I wrote an article for *Astounding* SCIENCE-FICTION—it was ASTOUNDING *Science-Fiction* then—called “Wanted—Suggestions,” in which I touched upon some problems connected with sunspots which have long puzzled astronomers, and invited readers to try their luck at unraveling them. Although nobody came through with any ideas likely to cause Heisenberg or Chandrasekhar uneasiness over their jobs, I judge from the letters received that a lot of people had some fun trying, at least. Now a reader, Mr. Arthur H. Rapp of Saginaw, Michigan, has made the most brilliant suggestion of all. That I write a progress report telling what answers, if any, have turned up in the last ten years.

The previous article was concerned chiefly with some particular

problems relating to sunspots. Instead of going over these same problems again, I think it would be of more interest to tell something about the sunspot problems as a whole, for it seems almost certain that when we do get on the right track, all the little parts will fall neatly into place, without the necessity of having to cook up hypotheses to care for each of them separately. At the end of this article, however, the reader will find a brief summary of the seven problems for which suggestions were wanted in 1940.

Probably the most significant development in the sunspot situation has been the recent discovery of a new type of disturbance called *magneto-hydrodynamical* waves, which may prove of great value in interpreting a wide variety of celestial phenomena. Whether they can ac-

count for sunspots seems very doubtful. This is unfortunate for the most elaborate theory of sunspots ever proposed has been based upon the properties of these waves. The collapse of this theory has left the field more confused than before, if that is possible. Thus instead of wanting suggestions we are more in the position of being in dire need of help. Nothing is fixed. Everything is open to question. I doubt if there is a single subject in solar astrophysics that cannot be challenged on some ground.

"Wait a minute!" I can hear you object. "How about the carbon cycle? What's the matter with it?"

Well, I shouldn't tell this because it's still strictly top secret, but even the carbon cycle begins to look a little shaky. According to new data as yet unpublished the deuterium reaction is the one that keeps the sun shining. For eleven years now the carbon cycle has been a true and trusted friend. Laying it away will be like a death in the family.

On the basis of our present knowledge, anybody who can't figure out a better theory of sunspots than some of the eminent astronomers of the past should go take an intensive course in basic physics at once. Theories proposed less than a generation ago now seem preposterous. The sunspot problem is somewhat similar to that of the craters of the moon. Both objects can be studied in detail. An immense amount of information has been accumulated about them. Yet there is no agree-

ment among authorities as to their origin. Some day we will go to the moon and get the answer directly. But I doubt if we will ever get close enough to Old Sol to answer the question of What is a sunspot?

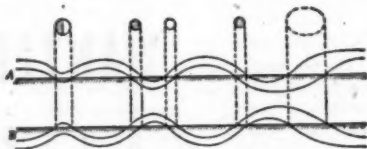


Fig. 3. Bjerknes' Sea Serpent Hypothesis.

The vortex theory of sunspots attained its fullest development in the sea serpent hypothesis advanced by the Norwegian physicist, V. Bjerknes.

He envisaged two zonal vortexes extending entirely around the sun-like snakes, parallel to the equator. The vortexes writhe and twist around. Where they intersect the solar surface they are assumed to produce sunspots.

From *ASTRONOMY* by Skilling and Richardson. Henry Holt & Co.

In 1795 Sir William Herschel published a theory of sunspots which is the most successful on record if durability is any criterion, for it held the field practically undisputed for more than half a century. You can still find it described in textbooks published around 1900.

The strength of Herschel's theory lay in its simplicity. It accounted for the appearance of a sunspot in a way that any high-grade moron could grasp in a minute. As the result of his observations, Herschel assumed that the main body of the sun consists of a dark solid central core

which is — presumably — inhabited. Above the dark core are two layers of cloud. The outer layer is the pho-



Fig. 4. Bjerknes' Sea Serpent Hypothesis.

Occasionally the vortex tube bends upward and meets the surface of the sun forming a pair of sunspots. Rotation of the gases produces magnetic fields of opposite polarity in the spots. Gases are lifted upward and cooled by the pumping effect of the circulating material within the vortex tube.

From ASTRONOMY by Skilling and Richardson. Henry Holt & Co.

tosphere, the hot bright shining surface that we see in the sky. Beneath the photosphere is a cooler layer that serves the practical purpose of shielding the inhabitants from the heat of the upper layer. Now and then there is a break in the clouds that gives us a peek at the underworld. The dark central umbra of a spot is simply the hole in the clouds. The lighter penumbra around it is formed by the cooler secondary cloud layer. It was just as simple as that. (See Figure 1.)

Like the man who lived to be a hundred because he was born before germs were discovered, Herschel's theory owed much of its vitality to the fact that scientists of his day were totally ignorant of the laws of thermodynamics. This removed the necessity of worrying about what kept the outer layer shining steadily,

or why the Solarians weren't all incinerated by its heat. Herschel did touch upon these topics briefly, but dismissed them casually as of minor importance. As to what kept the photosphere shining, he pointed out that the atmosphere of the earth was continually being used up in forming clouds, lightning, meteors, et cetera, yet after thousands of years there was still plenty to go around. And as for the second, the presence of a fiery layer didn't mean that everything in the vicinity would necessarily be at a high temperature. On top of a high mountain the sun didn't feel so hot, did it? Well, then maybe it didn't feel so hot to the solarians, either.

Herschel's position as one of the great astronomers of the world is secure. Yet he held some ideas that must have seemed a bit farfetched even to men of his own time. There was not the slightest doubt in his mind that all the planets are inhabited, even the sun. For as his observations showed, the sun itself is really nothing but a king-size planet. In his own words:

"The sun, viewed in this light, appears to be nothing else than a very eminent, large, and lucid planet, evidently the first, or in strictness of speaking, the only primary one of our system; all others being truly secondary to it. Its similarity to the other globes of the solar system with regard to its solidity, its atmosphere, and its diversified surface; the rotation upon its axis, and the fall of heavy bodies, leads us to suppose

that it is most probably also inhabited, like the rest of the planets, by beings whose organs are adapted to the peculiar circumstances of that vast globe.

"Whatever fanciful poets might say, on making the sun the abode of blessed spirits, or angry moralists devise, in pointing it out as a fit place of punishment for the wicked, it does not appear that they had any other foundation for their assertions than mere opinion and vague surmise; but now I think myself authorized, *upon astronomical principles*,* to propose the sun as an inhabitable world, and am persuaded that the forgoing observations, with the conclusions I have drawn from them, are fully sufficient to answer every objection that may be made against it." (!!)

It kind of takes your breath away. Even the boldest writers hesitate to endow planets such as Mercury, Jupiter, or Saturn with inhabitants, lest they incur the ridicule of scornful readers, yet only two generations ago one of the greatest astronomers felt no qualms on the matter whatever.

Herschel's immense reputation did much to keep the theory alive for many years after his death in 1822. It began to go into a decline by about the middle of the century, however, with the discovery of new knowledge such as the law of conservation of energy. For the next forty years there were no theories of sunspots

worth mentioning. Zöllner thought the surface of the sun is liquid and that the spots are places where masses of slaglike material has settled. Faye attributed them to storms boring into the solar atmosphere from above. Secchi preferred to regard them as depressions where ma-

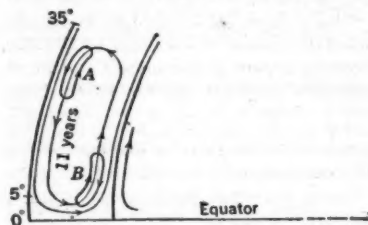


Fig. 5. Bjerknes' Sea Serpent Hypothesis.

Bjerknes postulated the existence of a general circulation in the sun extending in both hemispheres from the equator to about latitude 35°. The two zonal vortices, A and B, are carried around by the general circulation in a period of about twenty-two years.

Spots of the new cycle in about latitude 30 are produced when A approaches the surface. Spots of the old cycle near the equator disappear when the zonal vortex B dips below the surface.

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terial blown up from below had sunk. The theories were purely descriptive. Nobody worked out formulae and put figures in them to compare with observation.

At this point, let me warn readers against trying to devise a theory of sunspots based upon tidal action of the planets or bodies falling into the sun. Theories of this type have been

* The italics are Herschel's.

advanced repeatedly without meeting with the slightest success. A horrible example was the meteoritic encounter theory proposed in 1915 by the late H. H. Turner, formerly Astronomer Royal of England. Turner held that sunspots are caused by meteorites falling into the sun. The sunspot meteorites are produced by collisions between Saturn and the meteoric swarm known as the Leonids. Saturn and his ring are hit by a bunch of the Leonids. A shower of spray from the Leonids or Saturn's ring, or both, is tossed up and drawn into the sun. The meteorites striking the sun's surface produce the spots.

It seems incredible that a man with Turner's background ever could have seriously entertained such a notion. There is not one scrap of observational evidence to support such a theory. Turner admitted that other astronomers had not looked with a very friendly eye upon his theory, but thought that they would come around to it in time. Up to date, however, there has been no stampede in that direction.

Before going farther let us state briefly the principal facts of observation that any comprehensive theory of sunspots must include. There are only five but they are a formidable five:

1. The darkness of a spot due to the fact that the temperature of the umbra is about 2000° K lower than the surrounding photosphere.

2. The sharp boundary between the umbra and penumbra and the

penumbra and photosphere.

3. The rise and fall in the number of spots every eleven point one years on the average. This period is not fixed in the same sense that the period of revolution of the earth on its axis is fixed. It has been as short as nine years and as long as fourteen years. But there is no doubt as to its existence.

4. The change in latitude of the spots as the cycle progresses. The first spots of a new cycle break out in about latitude 35° . The zone of activity then gradually widens out toward the equator until eleven years later near the end of the cycle most of the spots are found at about latitude 8° . It is doubtful if any real bona fide spots have ever been observed much above latitude 50° , although some "flecks" have been reported as high as 72° .

5. A spot is always the center of a strong magnetic field. The polarity of spots is opposite in the northern and southern hemispheres. The polarities reverse at the beginning of each new cycle.

Photographs taken about 1908 in the light of hydrogen only revealed what appeared to be whirlpools surrounding the spots. Furthermore, the direction of rotation of a majority of the whirls in the northern and southern hemispheres of the sun corresponded to that of cyclones upon the earth. This strengthened the belief that sunspots are the centers of great storms or vortexes in the solar atmosphere. A few of the best examples of these vortexes have been

published again and again. (See Figure 2.) Because people have never seen anything else they naturally suppose that all spots show this vortex structure. As a matter of fact, you have to look through hundreds of plates before you can find a good case. Usually the structure around a spot is simply a confusion of dots and lines. After examining thousands of plates I doubt if the occasional examples of apparent vortex motion have any real significance.

On the assumption that spots are the centers of vortexes, however, the cooling was explained somewhat as follows. As the result of some sub-solar disturbance a mass of gas starts rising toward the surface. As the gas rises to levels of lower pressure it cools by expansion. Upon reaching

the surface it may be cooler than its surroundings. If the gas streams upward in a steadily rising current, a dark area will appear where the material is flowing outward. Friction of the rising stream with adjacent layers gives the current a twisting motion producing the vortex. Electrons whirled in the vortex create the magnetic field in the umbra.

The vortex idea reached its fullest development in Bjerknes' sea serpent hypothesis. (See Figures 3 and 4.) Bjerknes envisaged two giant vortexes, one in each hemisphere, reaching clear around the sun like snakes with their tails in their mouths. The vortexes writhe and twist like smoke rings; where they rise up and meet the surface a group of spots is produced. The whirling

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motion of the gas acts like a pump, lifting hot masses of gas upward and cooling them by expansion.

Bjerknes went on to explain the eleven-year period and the march of spots toward the equator on the assumption that there are two centers of activity circulating between the equator and latitude 35° every twenty-two years, as shown in Figure 5. (In my own mind, I have always thought of this as the Hot-Dog Theory of sunspot formation.) A new cycle begins when one center of activity reaches the surface at A. During the next eleven years it works its way toward the equator making sunspots as it goes, until it dips beneath the surface near B. About that time the other disturbance is breaking out again in higher latitudes. The theory gives a fine explanation of the general behavior of sunspots; which, incidentally, was what it was designed to do in the first place.

Suppose we grant for the sake of argument that we have a model spot produced by a rising current of gas cooling by expansion. Now as everyone knows, it takes energy to keep the electric refrigerator on the back porch running. But where is the source of energy that keeps the solar refrigerators running? Also, it is hard to see how a cool mass of gas could keep flowing *upward* for very long, for if it is cooler and therefore heavier than its surroundings, it would tend to sink rather than to

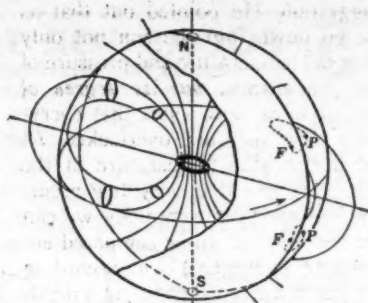


Fig. 6. Alven's Magneto-Hydrodynamical Theory of Sunspots.

As the result of some disturbance near the central core of the sun, two bundles of m-h waves in the form of whirl rings start toward the surface. The velocity of the whirl rings is faster in higher latitudes so that these reach the surface first, thus producing the march of spots toward the equator during the eleven-year cycle.

The whirl rings are supposed to reach the surface after about forty years where they create spots of opposite magnetic polarities in opposite hemispheres. Arrow shows direction of sun's rotation.

There is supposed to be a balance between the rate of energy generation in the central core and the solar rotation. This balance is periodically upset producing the eleven-year-old cycle.

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rise. To make the column of gas rise it must be lighter and, therefore, hotter than the gas around it. But, if the gas is hotter than its surroundings, it couldn't produce a dark spot.

These matters stood until 1930 when Albrecht Unsold, a young German astrophysicist, made a brilliant

suggestion. He pointed out that as we go down into the sun not only does the temperature and pressure of the gas change, *but its degree of ionization as well*, a fact that everybody previously had overlooked. At the surface the temperature of the sun is so low that very few atoms are ionized. (For simplicity we can consider the sun to be composed entirely of hydrogen.) But according to Unsold's original paper, at a depth of about ninety miles the temperature has risen to 8000° K and ionization begins to increase rapidly. At a depth of one hundred forty miles all the hydrogen has been ionized into electrons and protons. The process of ionization in this layer fifty miles

thick makes the gas so hazy that the temperature increases much faster with depth than is the case either above or below it. Or, putting it the other way around, going toward the surface the temperature drops rapidly from one hundred forty miles to ninety miles, and then more gradually over the remaining distance.

Now consider what would happen if as the result of some disturbance a mass of gas is thrown upward to the one-hundred-forty-mile level. The temperature of its surroundings suddenly begins to drop rapidly, much faster than the gas is cooling by expansion. The gas is, therefore, hotter and lighter than the material around it and is pushed rapidly up-

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ward, just as the hot light air over a bonfire is pushed upward by the heavier cooler air. At the ninety-mile level, however, the temperature of the expanding gas drops faster than the layers through which it is rising. This slows it down somewhat but it is still moving fast enough to coast the remaining distance to the surface. According to this model, all the cooling in a spot occurs in a shallow layer about ninety miles deep. If we could scoop away the material over a spot to a depth of one hundred twenty miles, we would find the cross-section of the rising column to be bright instead of dark.

Unsöld's discovery of the hydrogen convection zone constitutes an important contribution to astrophysics. (The theory of the origin of novae most favored today is based upon it.) It gives a fairly satisfactory explanation of item Number 1 on our list but hits a snag in Number 2—the sharp edges of the umbra and penumbra. If cooling is by convection, the edges of the spot should appear fuzzy instead of sharp; in fact, it is hard to see why there should be a definite boundary to a spot at all. Rather we should expect the spot to be darkest at the center and increase smoothly in brightness until it blends with the surrounding disk. The difficulty is so serious, that Professor T. G. Cowling of Bangor, England, who is probably the foremost authority on the structure of sunspots today, believes that all theories of sunspots based upon convection and vortex motion must be

abandoned.

But sunspots aren't something that are just on the limit of visibility like the canals of Mars. Anybody can see a spot almost any day he cares to look at the sun with a telescope no bigger than a spyglass. But how did they get there? Sometimes you wonder if maybe W. H. Julius wasn't right, and that sunspots are really optical illusions due to anomalous refraction in the solar atmosphere.

Such was the state of affairs when "Wanted—Suggestions" was written in 1940. The time seemed ripe for an attack on the problem from an entirely new angle. About 1943 H. Alfvén, a Swedish physicist, announced a theory that certainly owed little to the past. Previously it had always been assumed that the magnetic field in the umbra was a by-product, so to speak, of the spot itself. Alfvén argued the other way around—that the magnetic field came first and the spot came afterward as a necessary consequence.

Alfvén seems to have been led to his sunspot theory through the discovery of a new type of wave disturbance, which arises when a conducting liquid is placed in a constant magnetic field. Every motion of the liquid causes the flow of electric currents. The interaction between these currents and the magnetic field produces mechanical forces which tend to slow down the original motion of the liquid but speed it up at points nearby. Result is that two waves are started moving in opposite directions,

similar to the double-wave motion produced when a stretched string is suddenly released. Alfvén called this disturbance a "magneto-hydrodynamical"—m-h—wave. Such waves are too small to be observed experimentally in the laboratory, but they should become apparent in bodies of cosmic dimensions like the sun and nebulae.

According to Alfvén, spots are conceived in the sun's central core where most of the solar energy is generated. The unequal rate of rotation of the sun upon its axis disturbs the energy generation in the central core. These disturbances interacting with the sun's magnetic field produce m-h waves. Two waves travel off in opposite directions, one into the southern and the other into the northern hemisphere. The wave disturbances takes about forty years to reach the surface, where they form spots. From this point of view, a spot is merely a local disturbance in the magnetic field of the sun as a whole. (See Figure 6.)

The magnetic lines of force in the wave disturbance are supposed to be in a tight bundle until they reach the surface, where they tend to spread apart. This spreading creates a partial vacuum which sucks up material from below. Expansion of this material causes the gas to cool and form a dark spot.

The eleven-year cycle is the result of a balance between the energy production in the central core and the irregular rate of the sun's rotation. This balance is periodically upset



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thus producing the sunspot cycle. The disturbances travel faster in high latitudes so that these reach the surface first, followed by successive outbreaks toward the equator, thus accounting for the latitude effect.

So far as I am aware, no theory of sunspots has ever been developed in such elaborate detail as this one. But it is so intricate and so many of its assumptions seem so forced, that the whole structure is top heavy. Cowling has also given this theory a thorough going over and finds the objections to it very strong. He doubts if Alfvén's m-h waves could ever reach the surface in the first place, and thinks it very unlikely that they could produce dark spots even if they got there. One objection that comes immediately to mind is that there should be an equal number of spots in both hemispheres. But there have been long intervals when one hemisphere far exceeds the other in activity. Worse still, the sun seems to have lost the magnetic field it had forty years ago. At least, no one today is able to measure it any more.

As remarked earlier, although the magneto-hydrodynamical theory of sunspots has been severely criticized, the existence of the waves themselves has not been questioned. These waves can give rise to a variety of novel and unexpected effects. For example, the mottled markings on the disk of the sun or granulations indicate that the surface is in a state of violent agitation. This churning matter must disturb the magnetic

lines of force thus producing m-h waves. As the waves spread through the solar atmosphere their energy is turned to heat by damping. It is estimated that damping by m-h waves is sufficient to raise the temperature of the corona to a million degrees.

Consider a spaceship cruising at what seems like a safe distance from a star with a variable magnetic field, of the kind that has been observed recently. The star is surrounded by an excessively thin gaseous envelope so rarefied that it cannot be perceived at close range. Suddenly the crew notice that the temperature of the ship is rising rapidly. Before they can turn about and escape they are immersed in an invisible network of m-h waves which promptly roasts them to death, overtaken by a force they could neither see nor anticipate.

It is interesting to consider the general trend in the theories of the origin of sunspots during the last two hundred years. The early theories were extremely crude. The dark spots were holes in the surface, mountain tops projecting through the photosphere, or masses of slag. Gradually astronomers were compelled to discard such ideas in favor of ascending currents of gas or vortices, as postulated by Bjerknes in his sea serpent hypothesis. Now the vortex theories are being pushed aside for more intangible cooling devices based upon electromagnetic effects. Thus a theory just announced by Dr. D. H. Menzel of Harvard, the details of which are not available, ascribes spots to clouds of ionized gas

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ejected from "spicules" near the poles, which cascade back to the surface in the vicinity of the equator.

Personally, I still favor Herschel's old theory with a few minor changes here and there. In place of his solid inhabited central planet I would substitute an extensive "lake" of cool gas considerably larger than the over-all dimensions of the spot. Over this is a thin layer of slightly hotter material, and above this the photosphere. Occasional breaks in the photosphere reveal the cooler layer beneath which constitutes the penumbra of the spot, and the penumbra may also part at various places exposing the still darker umbral lake. The appearance of large spot groups upon the original negatives corresponds so closely to such a model that I am pretty well convinced in my own mind that it is the true one. How such a spot could be produced upon the sun is another matter. Like Turner's meteoritic hypothesis, the

Richardson lake theory has gained few adherents. (See Figure 7.)

Progress Reports on Questions Presented to Readers in "Wanted—Suggestions" in 1940

I. *Why is there a nearly constant difference in temperature between spot and photosphere of 1800° K?*

About all that can be said, is that according to Unsold's theory, this difference corresponds to the maximum cooling produced in a rising current expanding from the upper limit of the convection zone to the surface.

II. *Why are not rising currents observed in the umbra of spots by the Doppler effect?*

Why indeed? This is one of the objections Alfvén brought against the convection theories? Answer still unknown.

III. *The magnetic field in a sun-spot has been assumed to arise from*

charged particles whirled in a vortex. The polarity of the spot is then determined by the direction of whirl. At the beginning of a new cycle the polarity of the spots in the northern and southern hemispheres reverses sign. Yet no reversal is observed in the direction of whirl in the vortices.

Again no definite answer. But it begins to seem doubtful whether the apparent vortex structure observed around some spots is of any real significance.

IV. *Despite the work of a corps of experts many strong lines in the solar spectrum are still unidentified.*

Many of these lines have since been identified due to more laboratory work as well as theoretical investigations of atomic structure. Lines of four elements have also been added to the list of the elements known to exist in the sun in 1940. These are tin, terbium, thullium, and tantalum. Some of the identifications are still only tentative.

But many unknown lines still remain to challenge the spectroscopist. At present the strongest unidentified line in the solar spectrum is one in the infrared at wave-length 11876.32 A.

V. *There are persistently more spots observed on the approaching half of the sun's disk than on the half receding. That is, apparently more spots are born on the side of the sun turned away from the earth than on the side facing the earth.*

Several papers have been published in the last ten years attempting to explain the "Earth effect" by vari-

ous laws of the growth and visibility of spots. It is also possible that spots instead of being flat upon the solar surface are slightly tilted, so that the advancing side is higher than the side following. In this case, a spot near the approaching limb would appear smaller than when on the opposite side of the sun. But the origin of the earth effect is still obscure.

VI. *The wave-length of lines measured at the center of the sun's disk is always smaller than the wave-length of the same lines when measured near the limb. Relativity and rising currents in the sun cannot account for the way the wave-length changes from center to limb.*

Still a deep-mystery. Only suggestion is that the changing appearance of the granulations from center to limb may have something to do with it.

VII. *The velocity of rotation of the sun can be measured with high precision by spectroscopic methods. Yet different observers get values that differ much more than the errors of observation. Also, the velocity of rotation seemed to increase from 1914 to 1928 and then started to fall again. On the other hand, the velocity of rotation of the sun determined from long-lived spots has remained essentially the same for nearly a century.*

No progress. Astronomers have apparently given up this problem as hopeless.

Fig. 1. William Herschel, working without modern knowledge of radiation physics, postulated that the Sun proper was cool, habitable, and inhabited, and that the light came from a high layer of luminous clouds. Sunspots, like other phenomena, become harder to explain as you learn more facts!

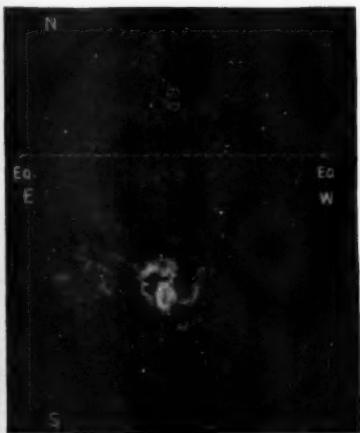


Fig. 7. When photographs of sunspots are examined under a microscope on the best negatives, they give the impression very strongly that they consist of a large cool "lake" with an overall area considerably larger than the visible spots.

There is a hotter layer above the lake and over this is the bright photosphere. Occasional breaks in the two layers produce the effects that we call the umbra and the penumbra of spots.

Such a model accounts for the sharp boundary between the umbra and penumbra and photosphere. Envisaging a very large umbral lake introduces no new difficulties, since we can't account for a small umbral region either.

Although such a model accounts for the observed appearance of sunspots, it imposes severe theoretical difficulties.

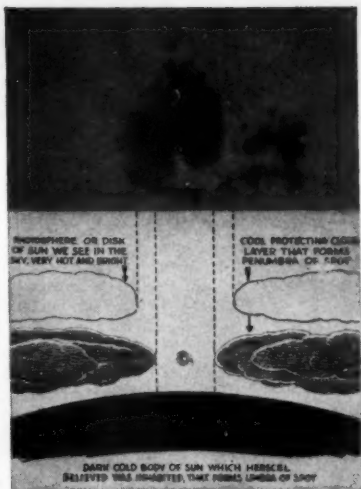
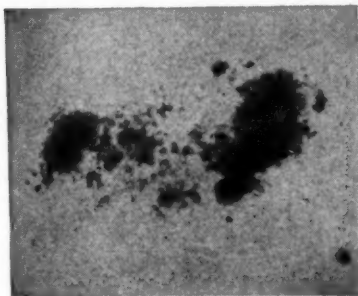


Fig. 2. Photographs of sunspots taken in the light of hydrogen only reveal a structure that sometimes resembles a vortex motion. Many spots, however, don't show the vortex clearly. The significance is still unknown.



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